9/13/84

EPA

**POTENTIAL HAZARDOUS WASTE SITE**
**SITE INSPECTION REPORT**

| REGION | SITE NUMBER (to be assigned by Hq) |
|---|---|
| 6 | TX 06785 |

**GENERAL INSTRUCTIONS:** Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition *(Section II)*. File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

## I. SITE IDENTIFICATION

| A. SITE NAME | B. STREET (or other identifier) | | |
|---|---|---|---|
| W. J. Smith Wood Preserving Co. | 1700 W. Morton St. | | |
| **C. CITY** | **D. STATE** | **E. ZIP CODE** | **F. COUNTY NAME** |
| Denison | TX | 75020 | Grayson |

**G. SITE OPERATOR INFORMATION**

| 1. NAME | 2. TELEPHONE NUMBER |
|---|---|
| W. J. Smith Wood Preserving Co. (C.C. Fehr, V.P.) | 214 465 6161 |

| 3. STREET | 4. CITY | 5. STATE | 6. ZIP CODE |
|---|---|---|---|
| P.O. Box 703 | Denison | TX | 75020 |

**H. REALTY OWNER INFORMATION** *(if different from operator of site)*

| 1. NAME | 2. TELEPHONE NUMBER |
|---|---|
| Katy Industries (Corporate Ownership) 853 Dundee Ave. | 312 697 8900 |

| 3. CITY | 4. STATE | 5. ZIP CODE |
|---|---|---|
| Elgin | ILL | 60120 |

**I. SITE DESCRIPTION**

Wood Preserving facility with a series of seven (7) pits covering 3.5 acres

**J. TYPE OF OWNERSHIP**

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

## II. TENTATIVE DISPOSITION *(complete this section last)*

| A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.) | B. APPARENT SERIOUSNESS OF PROBLEM |
|---|---|
| | ☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE |

**C. PREPARER INFORMATION**

| 1. NAME | 2. TELEPHONE NUMBER | 3. DATE (mo., day, & yr.) |
|---|---|---|
| Robert H. Davis, Jr. | 512-477-9901 | 8/14/84 |

## III. INSPECTION INFORMATION

**A. PRINCIPAL INSPECTOR INFORMATION**

| 1. NAME | 2. TITLE | |
|---|---|---|
| Glynis H. Fowler | Staff Engineer | |
| **3. ORGANIZATION** | | **4. TELEPHONE NO. (area code & no.)** |
| Engineering-Science, Inc. 2901 N. Interregional Austin, TX | | 512-477-9901 |

**B. INSPECTION PARTICIPANTS**

| 1. NAME | 2. ORGANIZATION | 3. TELEPHONE NO. |
|---|---|---|
| | | |
| | | |
| | | |

**C. SITE REPRESENTATIVES INTERVIEWED** *(corporate officials, workers, residents)*

| 1. NAME | 2. TITLE & TELEPHONE NO. | 3. ADDRESS |
|---|---|---|
| Billy L. Redding | Pres. 214-465-6161 | P.O. Box 703 Denison, TX 75020 |
| Patric Jolly | Staff Engineer 214-739-0094 | Albert Halff Assoc., Inc. 8616 NW Plaza Dr., Dallas, TX 75225 |
| | | |
| | | |
| | | |
| | | |

REVIEWED BY (AEGIN) DATE 10-3-84

174044



Continue On Reverse

*Continued From Front*

## III. INSPECTION INFORMATION *(continued)*

D. GENERATOR INFORMATION *(sources of waste)*

| 1. NAME | 2. TELEPHONE NO. | 3. ADDRESS | 4. WASTE TYPE GENERATED |
|---|---|---|---|
| W.J. Smith Wool Preserving | | 1700 W. Morton St., Denison, TX | |
| | 214-465-6161 | | Phenol, Creosote, |
| | | | pine resins |

E. TRANSPORTER/HAULER INFORMATION

| 1. NAME | 2. TELEPHONE NO. | 3. ADDRESS | 4. WASTE TYPE TRANSPORTED |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

| 1. NAME | 2. TELEPHONE NO. | 3. ADDRESS |
|---|---|---|
| | | |
| | | |
| | | |

| G. DATE OF INSPECTION (mo., day, & yr.) | H. TIME OF INSPECTION | I. ACCESS GAINED BY: *(credentials must be shown in all cases)* |
|---|---|---|
| 5/22/84 | 1:00 p.m. | [X] 1. PERMISSION [ ] 2. WARRANT |

J. WEATHER *(describe)*

Overcast, warm

## IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

| 1. SAMPLE TYPE | 2. SAMPLE TAKEN *(mark 'X')* | 3. SAMPLE SENT TO: | 4. DATE RESULTS AVAILABLE |
|---|---|---|---|
| a. GROUNDWATER | No surveys were collected. | | |
| b. SURFACE WATER | | | |
| c. WASTE | | | |
| d. AIR | | | |
| e. RUNOFF | | | |
| f. SPILL | | | |
| g. SOIL | | | |
| h. VEGETATION | | | |
| i. OTHER *(specify)* | | | |

B. FIELD MEASUREMENTS TAKEN *(e.g., radioactivity, explosivity, PH, etc.)*

| 1. TYPE | 2. LOCATION OF MEASUREMENTS | 3. RESULTS |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

*Continued From Page 2*

## IV. SAMPLING INFORMATION *(continued)*

C. PHOTOS

1. TYPE OF PHOTOS: [X] a. GROUND [ ] b. AERIAL
2. PHOTOS IN CUSTODY OF: Attached

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS: Attached

E. COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 33° 45' 30"
2. LONGITUDE *(deg.-min.-sec.)*: 96° 34' 30"

## V. SITE INFORMATION

A. SITE STATUS

[X] 1. ACTIVE *(Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)* (7 ponds are inactive)

[ ] 2. INACTIVE *(Those sites which no longer receive wastes.)*

[ ] 3. OTHER *(specify)*: _____ *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

[ ] 1. NO [ ] 2. YES *(specify generator's four-digit SIC Code)*: 2491

C. AREA OF SITE *(in acres)*: 3.5 acres total for 7 ponds

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [X] 2. YES *(specify)*: office, process whse, pdt storage, waste treatment

## VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity*(ies)* and details relating to each activity by marking 'X' in the appropriate boxes.

| 'X' | A. TRANSPORTER | 'X' | B. STORER | 'X' | C. TREATER | 'X' | D. DISPOSER |
|---|---|---|---|---|---|---|---|
| | 1. RAIL | | 1. PILE | | 1. FILTRATION | | 1. LANDFILL |
| | 2. SHIP | | 2. SURFACE IMPOUNDMENT | | 2. INCINERATION | | 2. LANDFARM |
| | 3. BARGE | | 3. DRUMS | | 3. VOLUME REDUCTION | | 3. OPEN DUMP |
| | 4. TRUCK | | 4. TANK, ABOVE GROUND | | 4. RECYCLING/RECOVERY | X | 4. SURFACE IMPOUNDMENT |
| | 5. PIPELINE | | 5. TANK, BELOW GROUND | | 5. CHEM./PHYS./TREATMENT | | 5. MIDNIGHT DUMPING |
| | 6. OTHER *(specify)*: | | 6. OTHER *(specify)*: | | 6. BIOLOGICAL TREATMENT | | 6. INCINERATION |
| | | | | | 7. WASTE OIL REPROCESSING | | 7. UNDERGROUND INJECTION |
| | | | | | 8. SOLVENT RECOVERY | | 8. OTHER *(specify)*: |
| | | | | | 9. OTHER *(specify)*: | | |

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

[ ] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [X] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

## VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [ ] 2. SOLID [ ] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[ ] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [ ] 4. HIGHLY VOLATILE

[X] 5. TOXIC [ ] 6. REACTIVE [ ] 7. INERT [ ] 8. FLAMMABLE

[ ] 9. OTHER *(specify)*:

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

*Continued From Front*

## VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit of measure)* of waste by category; mark 'X' to indicate which wastes are present.

| a. SLUDGE | b. OIL | c. SOLVENTS | d. CHEMICALS | e. SOLIDS | f. OTHER |
|---|---|---|---|---|---|
| AMOUNT: 13,000(est) | AMOUNT: unknown | AMOUNT: None | AMOUNT: Unknown | AMOUNT: None | AMOUNT: NOne |
| UNIT OF MEASURE: cu. yds | UNIT OF MEASURE: | UNIT OF MEASURE: | UNIT OF MEASURE: | UNIT OF MEASURE: | UNIT OF MEASURE: |
| X (1) PAINT, PIGMENTS | X (1) OILY WASTES | X (1) HALOGENATED SOLVENTS | X (1) ACIDS | X (1) FLYASH | X (1) LABORATORY, PHARMACEUT. |
| (2) METALS SLUDGES | X (2) OTHER *(specify)*: | (2) NON-HALOGNTD. SOLVENTS | (2) PICKLING LIQUORS | (2) ASBESTOS | (2) HOSPITAL |
| (3) POTW | | (3) OTHER *(specify)*: | (3) CAUSTICS | (3) MILLING/MINE TAILINGS | (3) RADIOACTIVE |
| (4) ALUMINUM SLUDGE | | | (4) PESTICIDES | (4) FERROUS SMELTING WASTES | (4) MUNICIPAL |
| X (5) OTHER *(specify)*: | | | (5) DYES/INKS | (5) NON-FERROUS SMLTG. WASTES | (5) OTHER *(specify)*: |
| 7 inactive ponds sediment containing creosote. Source: closure plan | | | (6) CYANIDE | (6) OTHER *(specify)*: | |
| | | | X (7) PHENOLS | | |
| | | | (8) HALOGENS | | |
| | | | (9) PCB | | |
| | | | (10) METALS | | |
| | | | X (11) OTHER *(specify)*: creosote from coal tar | | |

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

| 1. SUBSTANCE | 2. FORM *(mark 'X')* a. SOLID | b. LIQ. | c. VAPOR | 3. TOXICITY *(mark 'X')* a. HIGH | b. MED. | c. LOW | d. NONE | 4. CAS NUMBER | 5. AMOUNT | 6. UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| Creosote active part: (Creosol) | | x | | | x | | | 93-51-6 | Unknown | |
| Phenol | | x | | | x | | | 108-95-2 | Unknown | |
| Pentachlorophenol | | x | | | x | | | 87-86-5 | Unknown | |
| Other constituents identified through sampling and analysis are listed in Appendix B, Table IV. | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

## VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

☐ A. HUMAN HEALTH HAZARDS



*Continue On Page 5*

*Continued From Page 4*

## VIII. HAZARD DESCRIPTION *(continued)*

☐ B. NON-WORKER INJURY/EXPOSURE

☐ C. WORKER INJURY/EXPOSURE

☐ D. CONTAMINATION OF WATER SUPPLY

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER

Potential exists for impacting groundwater. No wells are presently in the area for monitoring although closure plans include such. Soil borings conducted by the facility at the inactive ponds showed fill soils of clay and sandy clay interspersed with pockets of sand. Closure plans include excavation and solidification of bottom sediments.

☐ G. CONTAMINATION OF SURFACE WATER

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☐ J. CONTAMINATION OF AIR

☒ K. NOTICEABLE ODORS

Odors of phenols, creosote, and aromatics were detected in the vicinity of the pits during the inspection.

☒ L. CONTAMINATION OF SOIL

Seven inactive disposal pits contain an estimated 13,000 cubic yards of creosote-laden bottom sediment.

☐ M. PROPERTY DAMAGE

*Continued From Page 6*

## VIII. HAZARD DESCRIPTION *(continued)*

☐ N. FIRE OR EXPLOSION

☐ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☒ R. INADEQUATE SECURITY

Inactive disposal pits are not surrounded by a fence. Facility personnel indicated that youths on motorcycles frequently rode in the vicinity of the pits. Signs are posted.

☐ S. INCOMPATIBLE WASTES

## VIII. HAZARD DESCRIPTION *(continued)*

☐ T. MIDNIGHT DUMPING

☐ U. OTHER *(specify)*:

## IX. POPULATION DIRECTLY AFFECTED BY SITE

| A. LOCATION OF POPULATION | B. APPROX. NO. OF PEOPLE AFFECTED | C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA | D. APPROX. NO. OF BUILDINGS AFFECTED | E. DISTANCE TO SITE *(specify units)* |
|---|---|---|---|---|
| 1. IN RESIDENTIAL AREAS | 24,000 | 24,000 | 10,000 | 2-3 mi |
| 2. IN COMMERCIAL OR INDUSTRIAL AREAS | 4,200 | 4,200 | 65 | 2-3 mi |
| 3. IN PUBLICLY TRAVELLED AREAS | 9,300 | 9,300 | 0 | -1 mi |
| 4. PUBLIC USE AREAS *(parks, schools, etc.)* | 5,600 | 5,600 | 15 | 2-3 mi |

## X. WATER AND HYDROLOGICAL DATA

| A. DEPTH TO GROUNDWATER *(specify unit)* | B. DIRECTION OF FLOW | C. GROUNDWATER USE IN VICINITY |
|---|---|---|
| 40-90 ft; 230-400 ft [1] | Shallow South, Antlers-Etos Trinity | Irrigation (1 well) |
| **D. POTENTIAL YIELD OF AQUIFER** | **E. DISTANCE TO DRINKING WATER SUPPLY** *(specify unit of measure)* | **F. DIRECTION TO DRINKING WATER SUPPLY** |
| 0-700 gpm; 0-600 gpm [2] | 2 mi | Northwest |

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS☐ ☒ 2. COMMUNITY *(specify town)*: > 15 CONNECTIONS Denison

☒ 3. SURFACE WATER ☐ 4. WELL Randell Lake

 *Continue On Page 9*

[1] Initial range applies to saturated zone depth; 2nd range applies to static water for the Antlers-Trinity aquifer wells.

[2] First range represents yeild of Antler formation wells; 2nd range shows possible yields of Paluky aquifer wells.

Continued From Page 8

## X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

| 1. WELL | 2. DEPTH (specify unit) | 3. LOCATION (proximity to population/buildings) | 4. NON-COMMUNITY (mark 'X') | 5. COMMUNITY (mark 'X') |
|---|---|---|---|---|
| None | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

I. RECEIVING WATER

1. NAME Unnamed tributary into Waterloo Lake and finally in the Red River

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Red River Basin Segment #0202 approved for: contact and non-contact recreation, propagation of fish and wildlife, and domestic raw water supply.

## XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN See attached map. ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

## XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

| 'X' | A. OVERBURDEN | 'X' | B. BEDROCK (specify below) | 'X' | C. OTHER (specify below) |
|---|---|---|---|---|---|
| X | 1. SAND [mixture] | | | | |
| X | 2. CLAY [observed] | | | | |
| | 3. GRAVEL | | | | |

## XIII. SOIL PERMEABILITY

Urban land Gasil loamy-fine sand * Crostell fine sandy loam

☒ A. UNKNOWN $10^{-3}$ to $10^{-4}$ cm/s ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☐ C. HIGH (1000 to 10 cm/sec.) $10^{-5}$ mls

☒ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☒ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS: Possible partial site recharge to the Woodbine aquifer through surface runoff and direct infiltration into the outcrop to the south.

H. DISCHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

I. SLOPE

| 1. ESTIMATE % OF SLOPE | 2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC. |
|---|---|
| 1-4% | South and southwesterly slope. |

J. OTHER GEOLOGICAL DATA

The outcropping site geologic stratum, the Washita and Fredericksburg groups of the Cretaceous age-Comanche Series, maintain a 550-575 foot section of poor to fair water-bearing zones. They are chiefly limestone, marl, and clay with some sand and serve as a minor*



*See Attachment A.

*Continued From Front*

## XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

| A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.) | B. ISSUING AGENCY | C. PERMIT NUMBER | D. DATE ISSUED (mo., day, & yr.) | E. EXPIRATION DATE (mo., day, & yr.) | F. IN COMPLIANCE (mark 'X') 1. YES | 2. NO | 3. UNKNOWN |
|---|---|---|---|---|---|---|---|
| Solid Watse | TDWR | SWR 31332 | 2-6-76 | - | | | X |
| RCRA | EPA | TXD066368879 | Notified 8-4-80 Int. Status 8-4-81 | - | X small qty generator | | |
| City Dischg. | Denison | | 6/27/78 | - | | | X |
| Air | TACB | 296 | - | - | | | X |
| Wastewater | TWPCB | 00502 | 1969 | 1974 | | N/A | |

## XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☐ NONE ☒ YES (summarize in this space)

The company had a wastewater discharge permit until 1975 when they began discharging to the City of Denison Sanitary Sewer. The company was required by TDWR to submit a closure plan for the earthern separation pond and the seven disposal pits. This document was submitted in December 1983 and is currently being reviewed by TDWR.

**NOTE:** Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

RCRA 3Ø12 SITE INSPECTION COMMENTS
WJ SMITH WOOD PRESERVING COMPANY
DENISON, TEXAS
TXØ6785

## INTRODUCTION

On May 22, 1984 Glynis H. Fowler of Engineering-Science conducted a RCRA 3Ø12 site inspection of the WJ Smith Wood Preserving Company in Denison, Texas. The inspection consisted of an interview with facility representatives Billy Redding and Patrick Jolly (consultant) and a surveillance of the waste management areas.

## BACKGROUND

The following information was obtained during a previous site inspection conducted by the TDWR District 4 personnel in September 198Ø. This company has conducted wood preserving activities at this site since 19Ø9. The operation has consisted, at one time or other, of treating wood products, telephone poles, cross-ties, and fence posts with creosote or pentachlorophenol. Creosote has been and is still being used for a wood preserver. Pentachlorophenol was used from 1958 through 1975. The waste generated by the wood preserving operation from 19Ø9 until 1969 was contained in the 7 pit, 3.5 acre waste disposal site. The west pit was first constructed and as additional capacity was required a new pit constructed with the east pit being the last one to be constructed. According to Mr. Fehr, the original depth of pits range from 6 feet to 1Ø feet. The two west pits are reported to have been 6 feet deep and all others were 1Ø feet. During this inspection, the pits did not contain any water and the two west pits appeared to be solid. The waste in the remaining five pits appeared solidified along the edges with a jell-like condition existing over the remaining portion of the pits.

In 1969 the company stopped using the pits for waste disposal and began treating the wastewater prior to discharge to the stream, as permitted by Permit No. ØØ5Ø2 issued by the Texas Water Pollution Control Board. In 1974 the company completed its present wastewater pretreatment facility and

began discharging the wastewater to the City of Denison's sanitary sewerage system.

A formal closure plan was required and prepared as the result of the 1980 inspection. It was finally submitted to TDWR in December 1983, and is included here as Attachment 8. Included in the closure plan is the excavation and solidification of creosote-containing wastes in the seven disposal pits onto an adjacent fill area, and the offsite disposal of bottom sediment from the earthen surface impoundment used for second stage separation of creosolic waste water.

Through the interview it was learned that the closure plan had been approved by TDWR and that the company was into the engineering design stage of closure. Monitoring wells will be installed around the earthen surface impoundment ("clay hole"), and an existing 65 feet irrigation well located 900 feet SE of the disposal pits will serve as a monitoring point for the solidified pit waste fill area.

SITE SURVEILLANCE AND ASSESSMENT

The inspector was led on a tour of the facility and waste disposal areas by Mr. Redding and Mr. Jolly.

Contamination observed around the earthen impoundment was indicative of past overflows (see photo). The seven disposal pits were observed to be partially filled with rainwater and had black residue along their banks. No security or fence is provided for the abandoned pits which are located directly behind a residential area.

A medium assessment of hazard has been given to this site because of the quantity of creosote and phenolic wastes known to exist in the surface impoundment and disposal pits, and since both had been in use for a number of decades. Although natural and filled soils in the area are of low permeability, they are reported as being interspersed with pockets or layers of sand. Core samples taken from the waste pits revealed significant levels of polynuclear aromatics and long chain hydrocarbons (Attachment B, Table IV). At a later date when closure off the areas of concern has been completed, the risk of hazard will be significantly reduced. The site closure is being conducted under the direction of TDWR, and no further action is recommended under the RCRA 3012 program.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

| Corresponding number on form | Additional Remark and/or Explanation |
|---|---|
| XIII, A, D, & F | The site soil makeup is part Gasil-Urban land and part Crostell-Urban land with indicated values for each obtained from USDA Soil Survey of Grayson Co., Texas, 1977. |
| XIII, J | Aquifer in Grayson County.<br><br>The Woodbine Formation of the Creticeous-Gulf Series overlies the latter groups, cropping out immediately to the south and downdip of the site. The Woodbine, composed of up to 500 feet of chiefly sand with some clay, is a principal regional aquifer (see attached stratigraphic table).<br><br>The deeper and older Antler Formation/Trinity Group aquifer, made up of basically, sand and clay with gravel is a major aquifer in the area which can be tapped directly under the site. This member of the Comanche series with 1000 feet of section has up to 200 feet of deep water-bearing sands beneath the site. Some problems with saline water intrusion may complicate its local convenience of water supply.<br><br>All formations dip southerly with southeast and southwest trends down into the East Texas Basin. Major structural influences include the Preston Anticline and more southerly Sherman Syncline.<br><br>Additional geologic/hydrologic data is provided in Attachment B which is the closure plan submitted to YDWR by the facility in December 1983. |

**Table 1.—Stratigraphic Units and Their Water-bearing Properties**
**Yield, in gallons per minute (gal/min): small, less than 100 gal/min; moderate, 100—1,000 gal/min; large, more than 1,000 gal/min.**

| Era | System | Series | Group | Stratigraphic units | Approximate maximum thickness (feet) | Character of rocks | Water-bearing characteristics |
|---|---|---|---|---|---|---|---|
| Cenozoic | Quaternary | Recent | | Alluvium | 75 | Sand, silt, clay and gravel. | Yields small to large amounts of water to wells along the Red River |
| | | Pleistocene | | Fluviatile terrace deposits | | | |
| | Tertiary | Eocene | Wilcox | | 100 | Fine to medium sand with silt and clay | Yields small quantities of water to wells in the eastern part of the area. |
| | | Paleocene | Midway | | 150 | Gray, calcareous clay, in part silty to sandy | Do. |
| Mesozoic | Cretaceous | Gulf | Navarro | Kemp Clay<br>Corsicana Marl | 300 | Fossiliferous clay and hard limy marl | Not known to yield water to wells in the area. |
| | | | | *Nacatoch Sand* | 500 | Fine sand and marl, fossiliferous | Yields small to moderate quantities of water near the outcrop. |
| | | | Taylor | Marlbrook Marl<br>Pecan Gap Chalk<br>Wolfe City - Ozan Formations | 1,500 | Clay, marl, mudstone, and chalk | Yields small quantities of water to shallow wells. |
| | | | Austin | Gober Chalk<br>Brownstown Marl<br>Blossom Sand<br>Bonham Formation | 700 | Chalk, limestone, and marl; fine to medium sand, fossiliferous | Yields small to moderate quantities of water to wells in the northeastern part of the area; very limited as an aquifer. |
| | | | Eagle Ford | | 650 | Shale with thin beds of sandstone and limestone | Yields small quantities of water to shallow wells. |
| | | | Woodbine | | 700 | Medium to coarse iron sand, sandstone, clay and some lignite | Yields moderate to large quantities of water to municipal, industrial and irrigation wells. |
| | | Comanche | Washita | Grayson Marl - Mainstreet Limestone<br>Pawpaw Formation - Weno Limestone - Denton Clay<br>Fort Worth - Duck Creek<br>Kiamichi Formation | 1,000 | Fossiliferous limestone, marl, and clay; some sand near top | Yields small quantities of water to shallow wells. |
| | | | Fredericksburg | Edwards Limestone<br>Comanche Peak Formation — Goodland Limestone | 250 | Limestone, clay, marl, shale, and shell agglomerates | Do. |
| | | | | Walnut Formation | | | |
| | | | Trinity | Antlers Formation: *Paluxy Formation* | 900 (400) | Fine sand, sandy shale, and shale | Yields small to moderate quantities of water to wells. |
| | | | | Antlers Formation: Glen Rose Formation | 900 (1,500) | Limestone, marl, shale, and anhydrite | Yields small quantities of water in localized areas. |
| | | | | Antlers Formation: Twin Mountains Formation | 900 (1,000) | Fine to coarse sand, shale, clay, and basal gravel and conglomerate | Yields moderate to large quantities of water to wells. |
| Paleozoic | | | | Paleozoic rocks undifferentiated | | Sandstone, limestone, shale and conglomerate | Yields small quantities of water in the western part of the area. |

Source : TDWR Report 269 V 1, 1982

ATTACHMENT B

Closure Plan for W.J. Smith Co.
Submitted to
TDWR in December 1983

TEXAS DEPARTMENT OF WATER RESOURCES

# CLOSURE PLAN

for

W. J. SMITH WOOD PRESERVING COMPANY
1700 WEST MORTON STREET
DENISON, TEXAS 75020

prepared by

ALBERT H. HALFF ASSOCIATES, INC.

DECEMBER, 1983

# I. INTRODUCTION

W. J. Smith Wood Preserving Company is located 1.4 miles west of the intersection of U.S. 75 and Morton Street in Denison, Texas. Wood is purchased in semi-finished form, air dried, trimmed into finished form such as cross ties or bridge timbers, then preserved with a creosote mixture in closed pressure cylinders. Since its inception in 1909, the company has used a gravity cresote-water separator with the sludge waste deposited into seven earthen storage basins. These storage basins were inactivated in 1971 and replaced by a wastewater treatment system described in Section B. In order to upgrade the facility, the existing gravity creosote-water separator will be replaced by a more efficient, state-of-the-art separator.

TDWR Permit Application for Industrial Waste Storage, Processing, Disposal Facility Part A - Facility Background Information was submitted in August 1980. Due to the inactive status of the seven storage basins, and the decision to reclaim the storage area and separator, no permit was issued; rather, the facility was granted interim status until closure is complete. A closure plan must be submitted and approved by the TDWR before the basins and gravity separator are disturbed.

In general, this report presents information on the existing conditions at the facility and recommends an on-site solidification process for closing out the basins. Closure recommendations for the inactive storage basins and the existing gravity separator will be addressed separately in this report.

## II. EXISTING CONDITIONS

### A. Site Locations, Existing Operations, and Future Modifications.

The W. J. Smith Wood Preserving Company utilized seven holding basins for the disposal of the sludge produced from the manufacturing facility. The inactive lagoons were in operation from 1909 to 1971 and contains sugars, starches, wood resins and wastewater from the creosote wood preserving operations (additional analytical data on the composition of the sludge within the holding basins are presented in Section II, Part C). Refer to Figure I for location.

The company is currently using an earthen berm gravity creosote-water separator, a concrete retention basin and a bacteriological wastewater treatment system to treat their wastewater. (For location, refer to Figure IA). Process wastewater is collected in a concrete basin, or "rock hole" which was constructed in 1909. Waste flows from the rock hole to the gravity separator where separation of the recoverable creosote occurs. Creosote is periodically pumped from the bottom of the separator into a holding tank for reuse. The effluent flows to a 450,000 gallon concrete retention basin (constructed in 1971) which serves as a sedimentation and equalization tank with a 24-hour retention time. The basin is also designed for spillage control and will contain the first one-inch of storm water runoff. Sedimentation from the retention basin is removed and dried on sand sludge drying beds. After nine years of operation, approximately three to four inches of dry cinder-like material has accumulated in the drying beds. The wastewater from the basin is then rerouted to a trickling filter (built in 1972) with an area equivalent to a 16.3 foot circular tower with a height of 22 feet. The influent rate is 0.043 million gallons per day (mgd) with a 0.05256 mgd recirculation rate. The effluent is discharged into the Denison sanitary sewer.

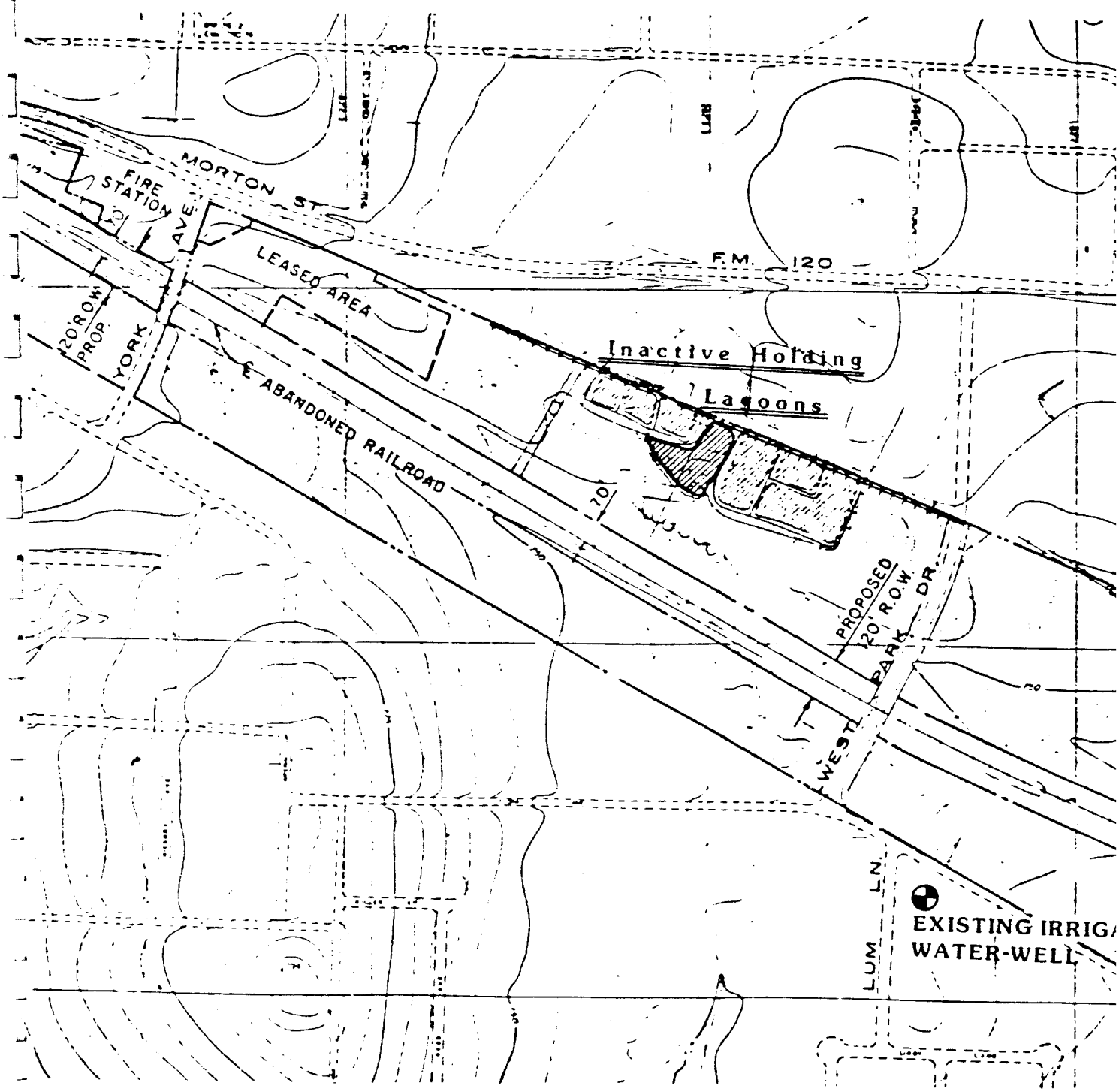
The creosote-water gravity separator is to be inactivated concurrently with the closure of the seven inactive holding lagoons. A concrete separator will replace the gravity separator.

### B. Geology and Soil.

The Denison area is geologically influenced by the Preston anticlime and is on the inner margin of the Gulf Coastal Plain. Maximum relief is approximately 380 feet. The surface slopes to the southeast. Tributaries of the Red River drains the area. Ground water flows to the east and south; the Trinity and Woodbine sands are the principal water-bearing formations. The soil and subsurface conditions of the site have been characterized by the Soil Conservation Service in their soil survey of Grayson County. Figure II locates and identifies the type of soils found in and around the inactive creosote-holding lagoons, and W. J. Smith Wood Preserving Company. Specifically, these soils are:

Figure I

LOCATION OF W. J. SMITH'S HOLDING LAGOONS
CITY OF DENISON
GRAYSON COUNTY, TEXAS




SCALE: 1" = 400'

11/28/83

# W. J. SMITH WOOD PRESERVING COMPANY

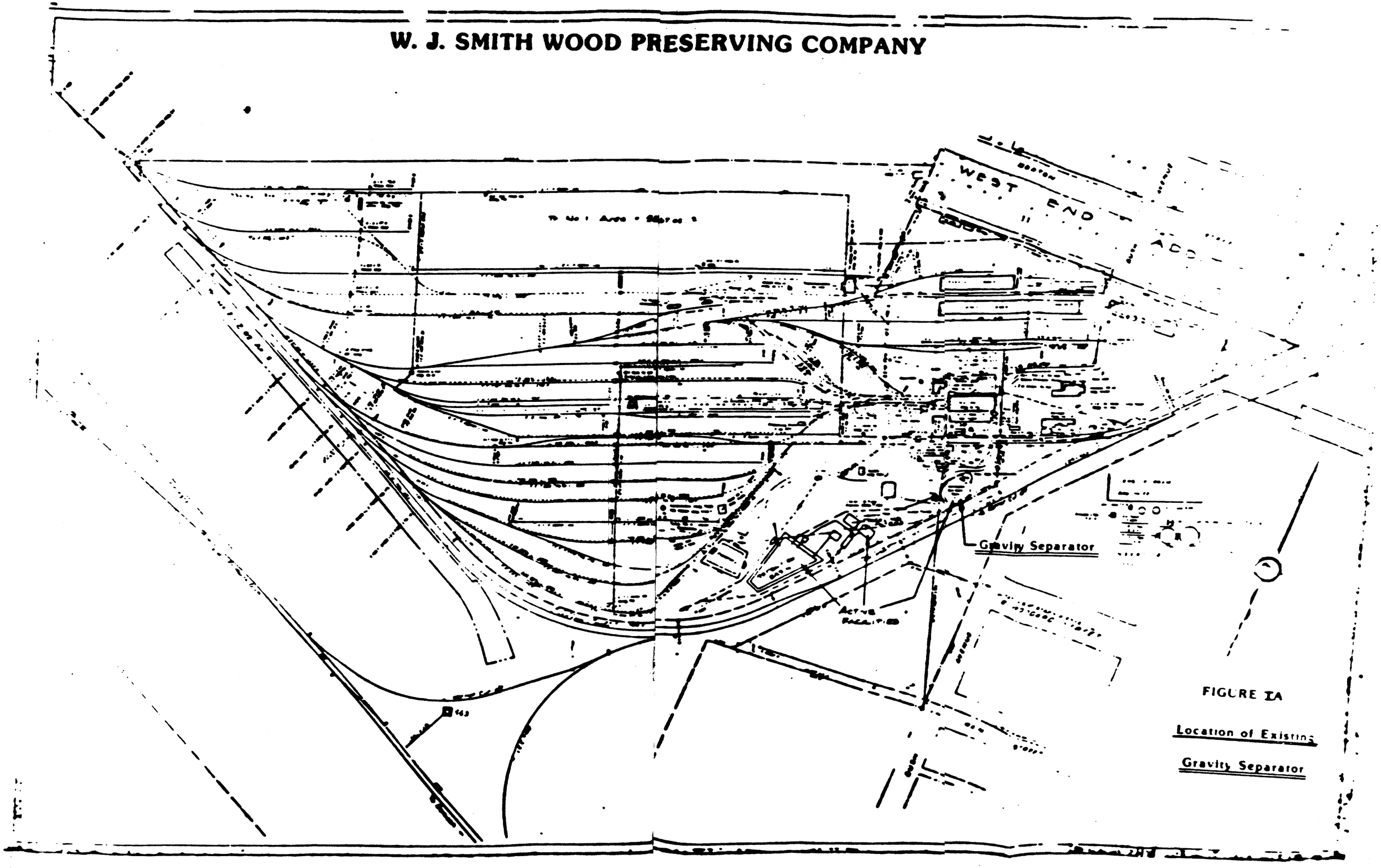



FIGURE IA

Location of Existing Gravity Separator

B. Geology and Soil (Continued)

Crosstell - Typically, the Crosstell soil has a surface layer of pale brown, neutral fine sandy loam about 3 inches thick. Below this to a depth of 22 inches is a very strongly acid clay. From 3 to 11 inches the clay is red and has reddish yellow and yellowish red mottles, from 11 to 22 inches it is reddish yellow and has red mottles. Between depths of 22 and 44 inches is mottled brownish yellow, red, and light gray, strongly acid clay, and below that to a depth of 60 inches is mottled yellowish brown, light gray, and reddish brown, mildly alkaline shaly clay. The Crosstell soils are moderately well drained. Run-off is medium. Permeability is very slow and available water capacity is medium. The hazard of erosion is severe.

Gasil - Typically, the surface layer of the Gasil soil is brown, medium acid loamy fine sand about 5 inches thick. Below this to a depth of 10 inches is yellowish brown, slightly acid loamy fine sand. Next to a depth of 66 inches is sandy clay loam. From 10 to 22 inches the sandy clay loam is strong brown and medium acid, and from 22 to 33 inches it is brownish yellow and strongly acid. From 33 to 45 inches the sandy clay loam is reddish yellow and strongly acid and has yellowish red mottles, from 45 to 56 inches it is brownish yellow and strongly acid and has yellowish red mottles, and from 56 to 66 inches it is reddish yellow and strongly acid and has red mottles. The Basil soil is well drained. Run-off is slow. Permeability is moderate, and available water capacity is medium. The hazard of erosion is moderate.

Sanger - Typically, the surface layer is dark gray, moderately alkaline clay about 6 inches thick. Below this to a depth of 62 inches is moderately alkaline clay. From 6 to 47 inches the clay is grayish brown, and from 47 to 62 inches it is mottled brownish yellow, gray, and grayish brown. The soil is well drained. Run-off is slow. Permeability is very slow, and available water capacity is high. The hazard of erosion is moderate.

Specific properties for each soil group, such as: liquid limit, plasticity, permeability, erosion, flooding, etc., are listed in Tables I, II, and III.

Figure III identified the subsurface formations present in the general area of the inactive creosote-holding lagoons. Section line C-C$^1$ gives a cross-sectional view of the different striations of the formation and is detailed in Figure IV.

The soil directly underneath the inactive holding lagoons is fill material. The material consists of clays and sandy clays as evident from the soil borings (see Section III-A). Underlying the fill are the Fredricksburg and Washita groups. The Fredricksburg group overlies the Trinity group in Grayson County and includes in ascending order, the Walnut clay, Goodland limestone, and the Kiamichi formations. The thickness of the group, chiefly clay and limestone ranges from 0 to 100 feet. The Walnut clay, Goodland limestone, and the Kiamichi formations are not known to yield water to wells in Grayson County.

Figure 11

11/28/83

CENTRAL SOIL MAP
PLATE NUMBER 18
GRAYSON COUNTY, TEXAS

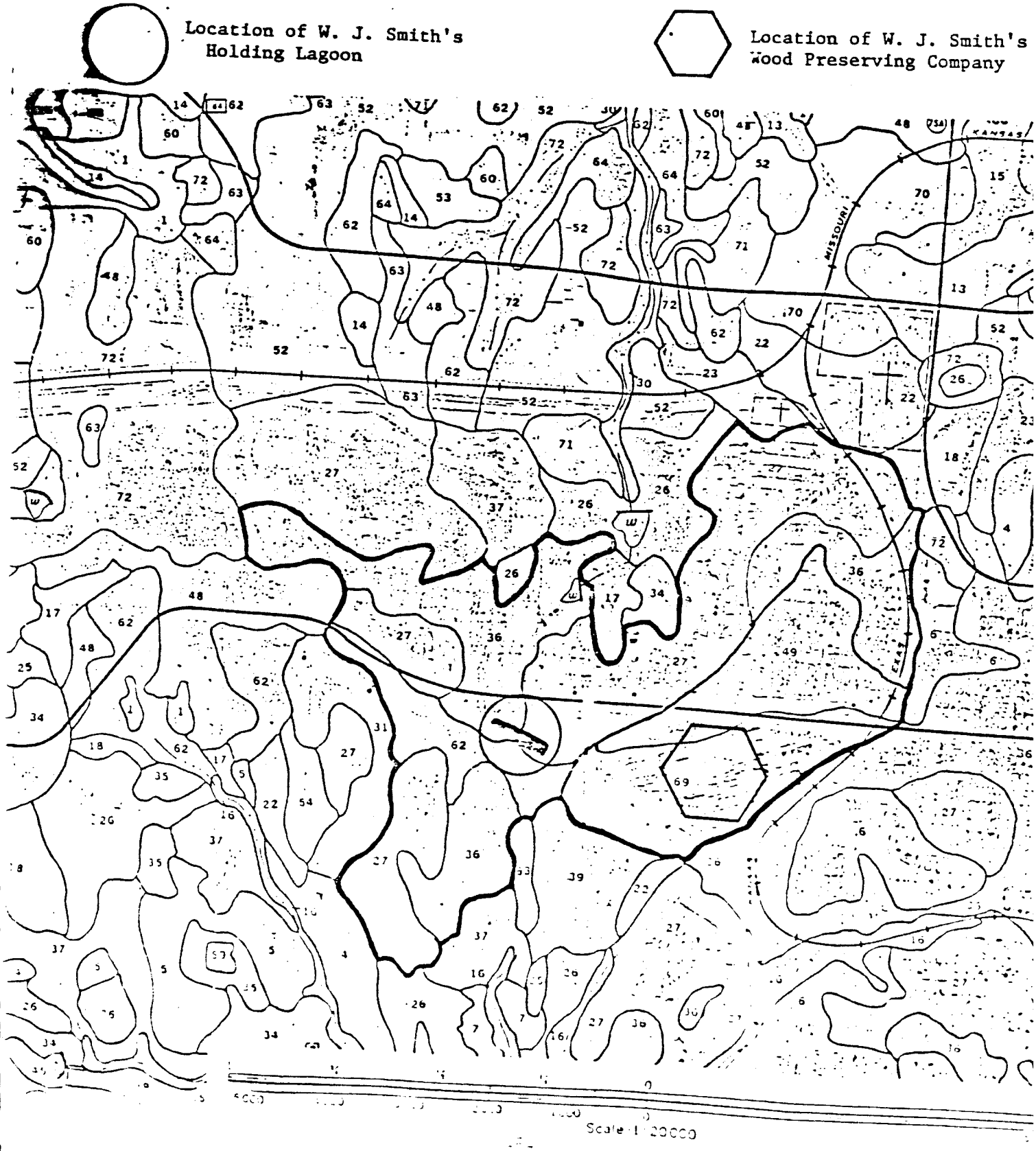


Table I -- ENGINEERING INDEX PROPERTIES*

| SOIL NAME | DEPTH | USDA TEXTURE | CLASSIFICATION | | PERCENT PASSING 200 SIEVE | LIQUID LIMIT | PLASTICITY LIMIT |
|---|---|---|---|---|---|---|---|
| | | | UNIFIED | AASHTO | | | |
| (27) Crosstell | 0-3" | Fine Sandy Loam | SM, ML, SM-SC, CL-ML | A-2-4 A-4 | 28-60 | <31 | NP-7 |
| | 3"-43" | Clay | CH, CL | A-7-6 | 51-75 | 42-60 | 25-40 |
| | 43"-60" | Stratified Clay to weathered bedrock | CH, CL, SC | A-7-6 A-6 | 36-88 | 35-55 | 15-35 |
| (36) Gasil | 0-10 | Loamy Fine Sand | SM, SM-SC | A-2-4, A-4 | 20-40 | <20 | NP-4 |
| | 10-66 | Sandy Clay Loam Loam, Fine Sandy Loam | CL, SC, CL-ML SM-SC | A-6, A-4 | 36-71 | 22-44 | 7-20 |
| (62) Sanger | 0-23" | Clay | CH | A-7-6 | 75-95 | 51-70 | 28-42 |
| | 23-49 | Clay-Silt Clay | CH, CL | A-7-6; A-6 | 85-100 | 40-60 | 20-36 |
| | 49-65 | Clay-Silt Clay | CH, CL | A-7-6; A-6 | 85-100 | 40-55 | 20-35 |

*Source: United States Department of Agriculture Soil Conservation Service.

Table II -- PHYSICAL AND CHEMICAL PROPERTIES*

| SOIL NAME | DEPTH (IN) | CLAY<2mm (PCT) | PERMEABILITY (IN/HR) | AVAILABLE WATER CAPACITY (IN/IN) | SOIL REACTION (pH) | SHRINK-SWELL POTENTIAL | EROSION FACTORS K | EROSION FACTORS T | WIND ERODIBILITY GROUP | ORGANIC MATTER (PCT) |
|---|---|---|---|---|---|---|---|---|---|---|
| (27) Crosstell | 0-3 | 5-15 | 0.6 - 2.0 | 0.10 - 0.14 | 5.6 - 7.8 | LOW | 0.43 | 3 | 3 | <1 |
| | 3-43 | 40-60 | <0.06 | 0.14 - 0.18 | 4.5 - 8.4 | HIGH | 0.37 | 3 | | |
| | 43-60 | 40-60 | <0.06 | 0.14 - 0.18 | 6.6 - 8.4 | HIGH | 0.37 | | | |
| (36) Gasil | 0-10 | 5-12 | 6.0 - 2.0 | 0.07 - 0.11 | 6.1 - 7.8 | LOW | 0.20 | 5 | 2 | <1 |
| | 10-66 | 15-35 | 0.6 - 2.0 | 0.12 - 0.19 | 5.1 - 6.5 | MODERATE | 0.32 | | | |
| (62) Sanger | 0-23 | 40-60 | <0.06 | 0.12 - 0.18 | 7.4 - 8.4 | HIGH | 0.32 | 5 | -- | 1 - 3 |
| | 23-49 | 40-60 | <0.06 | 0.12 - 0.18 | 7.9 - 8.4 | HIGH | 0.32 | | | |
| | 49-65 | 40-60 | <0.06 | 0.12 - 0.18 | 7.9 - 8.4 | HIGH | 0.32 | | | |

*Source: United States Department of Agriculture Soil Conservation Service.

Table III -- SOIL AND WATER FEATURES[*2]

| SOIL NAME | HYDROLOGIC[*1] GROUP | FLOODING | | | HIGH WATER TABLE | | | BEDROCK | |
|---|---|---|---|---|---|---|---|---|---|
| | | FREQUENCY | DURATION | MONTH | DEPTH | KIND | MONTHS | DEPTH | HARDNESS |
| (27) Crosstell | D | None | -- | -- | >6.0' | -- | -- | >60' | -- |
| (36) Gasil | B | None | -- | -- | >6.0' | -- | -- | >60' | -- |
| (62) Sanger | D | None | -- | -- | >6.0' | -- | -- | >60' | -- |

[*1] HYDROLOGIC SOIL GROUPS

A - Soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly.

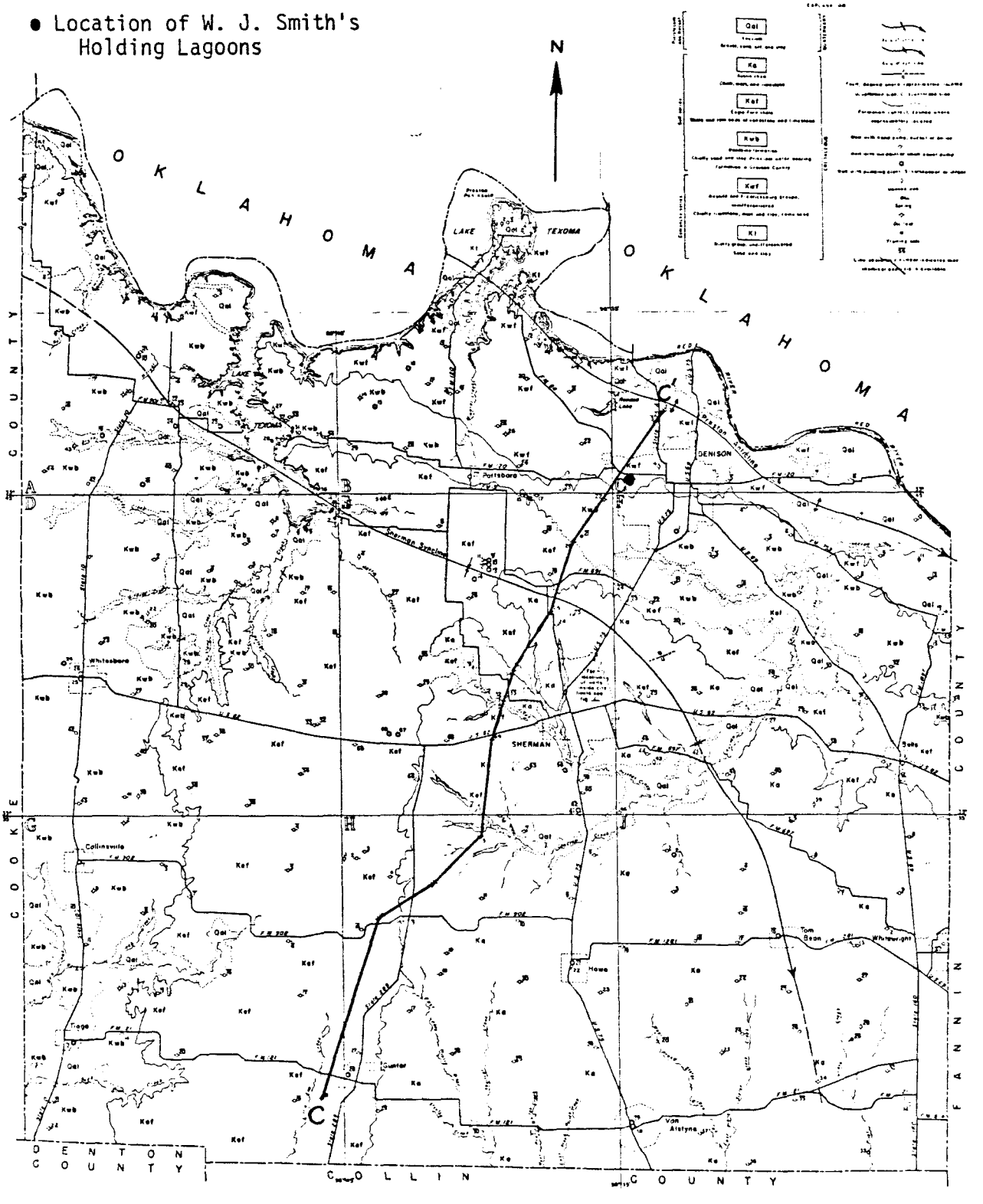
Other Extreme: D - Soils having a very slow infiltration rate and thus a high runoff potential. They have a clay-pan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material.

[*2] Source: United States Department of Agriculture Soil Conservation Service.

Figure III

GEOLOGIC MAP SHOWING LOCATI OF WELLS AND SPRINGS, GRAYSON COUNTY, TEXAS

• Location of W. J. Smith's Holding Lagoons



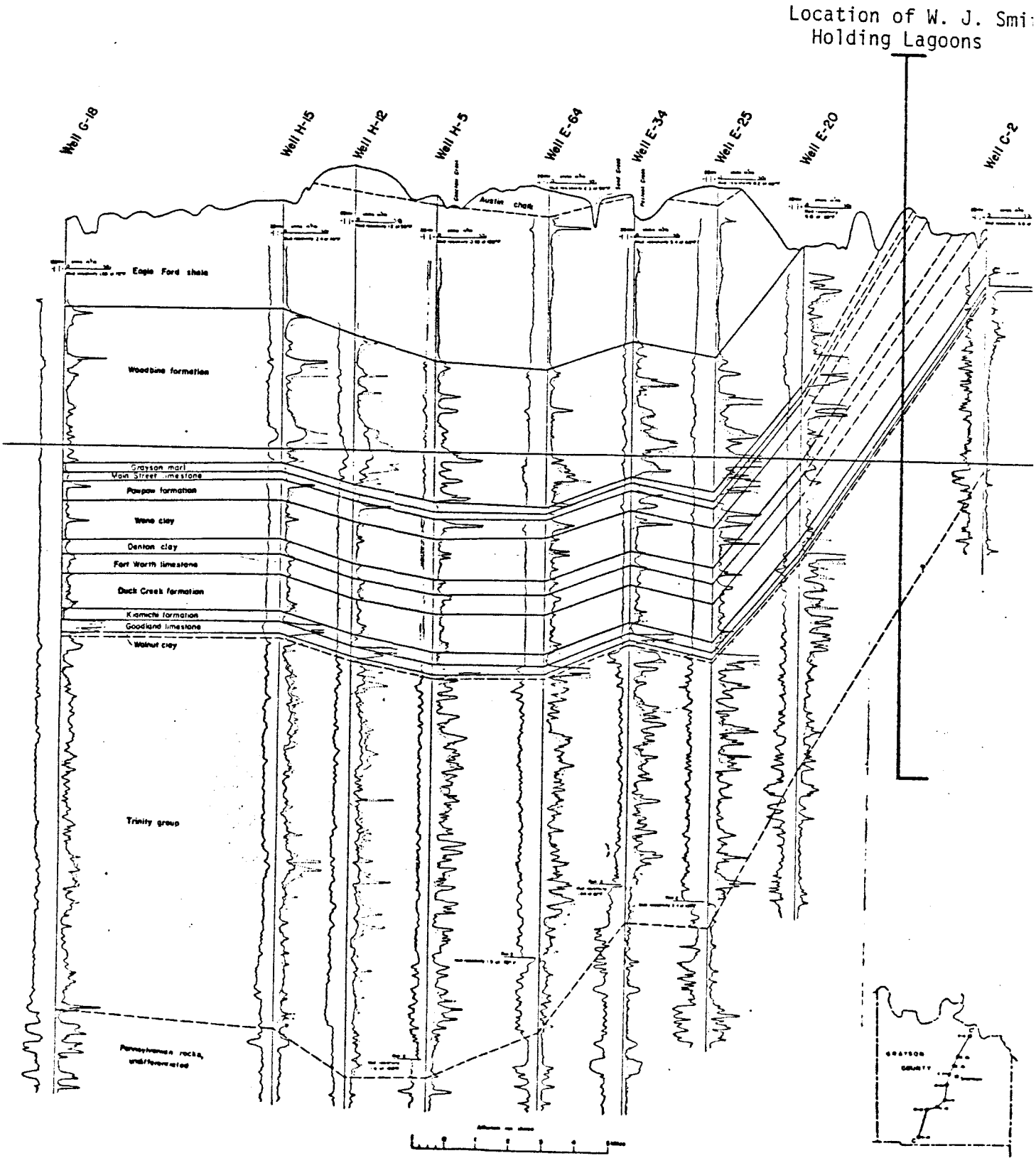

Base compiled from general highway map of the Texas Highway Department and U.S. Department of Agriculture Production and Marketing Administration aerial photos 1958

0 1 2 3 4 miles

Geology by E.T. Baker, Jr. U.S. Geological Survey Geology of Woodbine formation and alluvium modified from Bergquist (1949)

Figure IV

GEOLOGIC SECTION C-C,
GRAYSON COUNTY, TEXAS



B. Geology and Soil (Continued)

The Washita group, which overlies the Fredricksburg group with apparent uniformity, includes the Duck Creek formation, Fort Worth limestone, Denton clay, Weno clay, Pawpaw formation, Main Street limestone, and Grayson marl. The Washita group ranges in thickness from 435 to about 550 feet. The group is composed of alternating beds of limestone and marl but containing some sand near the top. The Washita group is not an important source of water in Grayson County.

C. Characteristics of the Waste and Land Use.

I. Waste Characteristics.

The seven inactive creosote-holding lagoons are located 0.1 mile south of FM 120, 0.2 mile north of Flora Lane, 0.33 mile east of York Avenue, and 0.15 mile west of West Park Road in Denison (refer to Figure I). Analytical analysis of the waste sludge was obtained from Allied Analytical Laboratories, Dallas, Texas, and is presented in Table IV. The lagoon area was estimated from an aerial photograph and field investigations. Soundings for the depth of the lagoons were made during the sludge sampling.

The depth of the sludge lagoons averaged approximately 3.5 feet. The estimated volume of waste from the seven lagoons to be solidifed is 13,000 cubic yards. Recovery of usable creosote from these lagoons is not possible. For eleven years these lagoons have been inactive and the resultant sludge has been exposed to bacterial decomposition altering the chemical and physical composition of the waste creosote.

The approximate volume of water and waste creosote in the existing gravity separator is 600 cubic yards. All usable creosote, which is estimated by officials at W. J. Smith to be approximately one-half (1/2) the current volume, will be removed from the separator.

II. Land Use.

The creosote sludge lagoons are located in currently undeveloped land. As shown in Figure V, the surrounding area is primarily undeveloped, medium density residential and commercial.

TABLE IV

WASTE SLUDGE ANALYSIS

On July 14, 1982, one (1) composite sample of creosote sludge was submitted for analysis. The results are shown below.

RESULTS

Specific Gravity 1.109

GC/Mass Spectrometric Analysis

The sample was diluted enough for injection with methylene chloride. This solution was then analyzed on the Hewlett-Packard GC/Mass Spectrometer System equipped with dual Flexible Discs. The spectra of all eluting compounds were searched using in-house computer methods and/or computer access to the EPA/CIS Computer System. The components of interest in the submitted sample were:

| | Range, ppm |
|---|---|
| Trimethylbenzene | 50-500 |
| Methyl Amyl Ketone | 100-1000 |
| Vinyl Toluene | 50-500 |
| Paraffinic Hydrocarbons $C_{10}$ - $C_{21}$ | 5000-50,000 |
| Naphalene | 5000-50,000 |
| Methyl Naphalenes | 5000-50,000 |
| Dimethyl Naphalenes | 5000-50,000 |
| Biphenyls | 500-5000 |
| Ethyl Naphalenes | 500-5000 |
| Acenaphene | 5000-50,000 |
| Trimethylnaphalenes | 500-5000 |
| Benzidene | 2000-20,000 |
| Methyldibenzofuran | 500-5000 |
| Anthracene | 2000-20,000 |
| Phenanthrene | 2000-20,000 |
| Methyl Anthrocenes | 500-5000 |
| Fluoranthene | 500-5000 |
| Benzophenanthrene | 500-5000 |
| Heavy "Oils" including cresylic acids ("Cresoles") | Remainder |

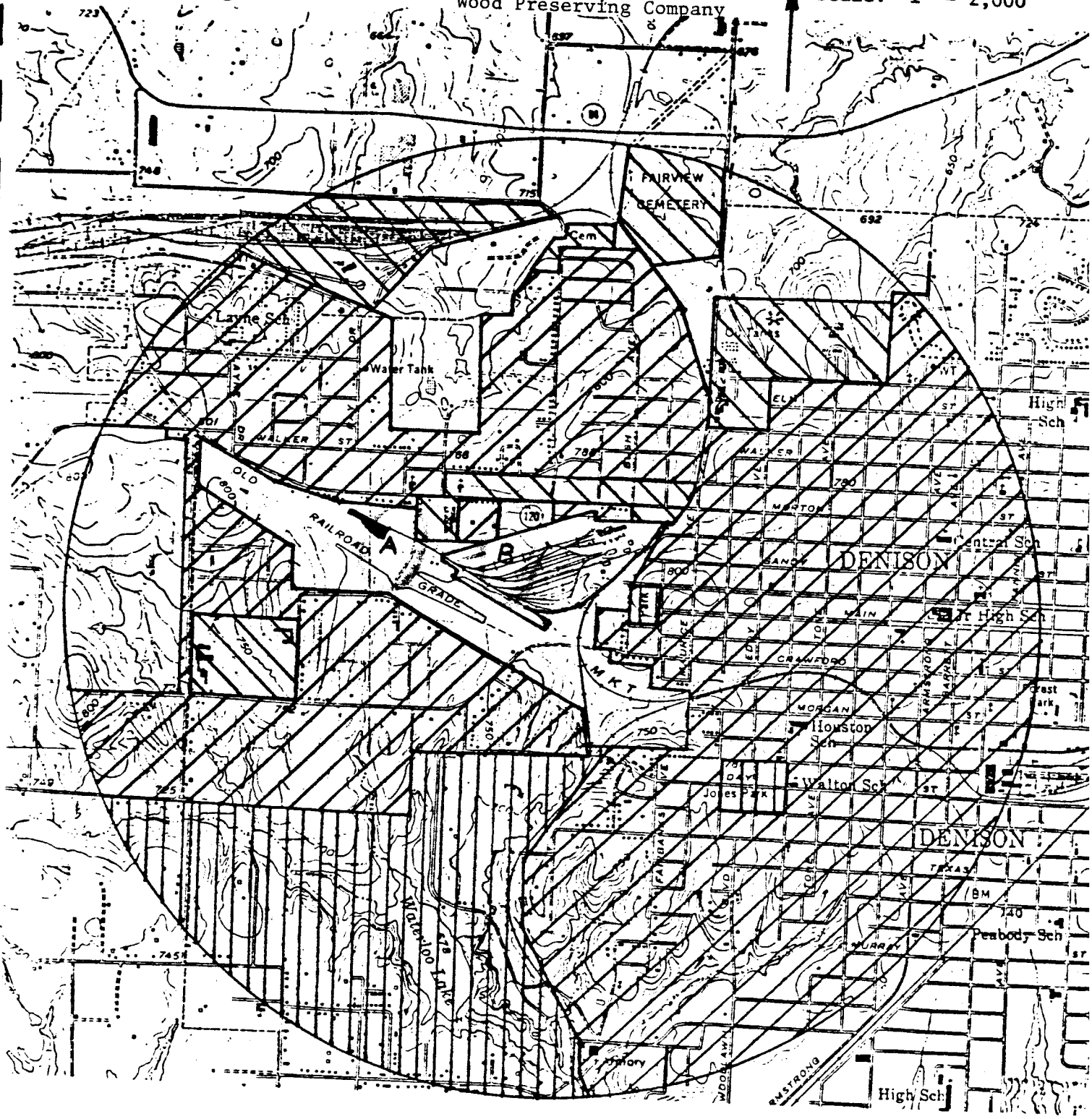
LAND USE PATTERN WITHIN ONE MILE OF
W. J. SMITH WOOD PRESERVING COMPANY

A - Location of W. J. S h's Holding Lagoons

B - Location of W. J. Sm. h's Wood Preserving Company

N

Scale: 1" = 2,000




RESIDENTIAL

RECREATIONAL

COMMERCIAL

UNDEVELOPED

## III. DISPOSAL ALTERNATIVES

### A. Soil Analysis: Proposed Land Fill Site.

The test objectives were to assess the feasibility of on-site solidification by identifying the types of soil present in and around the inactive creosote sludge-holding lagoons. The following paragraphs summarize the results of soil borings taken near the area of the holding lagoons. The log and location of each boring is presented on pages 15 through 19 and on Plate IX, respectively.

The subsurface strategraphy, as indicated by the borings, consists of varying thicknesses of fill soils, overlying natural clays and sandy clays. The natural clays and sandy clays appear to represent residual or weathered soil of the Woodbine Geological Formation. The fill soils consist of randomly placed clays and sandy clays with some pockets and/or layers of sand. The clays and sandy clays are of a moderate-to-high plasticity. The sands are non-plastic; generally medium-to-fine grained, and contain 15 to 30 percent fines.

Water was encountered during the borings and is believed to have resulted from infiltration through the fill soil. This water is not connected to the ground water aquifer but rather a perched water lens located at the interface of the natural clays and the fill clays. The height of the perched water varies from a depth of 3 feet at boring B-1, to not detected at B-2.

Specific soil parameters tested during the soil borings are presented in the following table, along with the proposed recommendations as suggested by the Texas Department of Water Resources Solid Waste Management Guidelines:

TABLE V
EXISTING SOIL INDEX PROPERTIES

| | TDWR Parameters | On-Site Soil | |
|---|---|---|---|
| | | Natural | Fill |
| Permeability (cm/sec) | $1x10^{-7}$ | $2.1x10^{-8}$ | $3.1x10^{-8}$ |
| % passing No. 200 sieve | 30 | 54 | 71 |
| Liquid limit | 30 | 40 | 41 |
| Plasticity | 15 | 21 | 23 |

The liquid and plastic limit determinations, minus No. 200 sieve analysis, and permeability test results are shown on the logs for each boring. Permeabilities were performed using the falling head method.

Observations:

The test results on the soils obtained from the borings indicate that both the natural clays and/or the fill clay could be used as a barrier or liner for the proposed land fill. It would be necessary to "even-out" the fill soil by compaction to eliminate the small sand seams within the area. To aid in construction of the land fill area, the depth of the pit should not penetrate the existing perched water lens.

Project: Landfill Investigation, Denison, Texas

Completion Depth: 13.5' | Date: 8-3-82 | Water Observations: Seepage @ 6.5' during drilling, water @ 1.1' and caved to 3' upon completion

Surface El. | Type: Undisturbed Sample

| Depth, Ft. | Symbol | Samples | Stratum Description | * | Moisture Content % | Unit Dry Wgt. Lbs/Cu. Ft. | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage % | Unconfined Compression Lbs/Sq. Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dark brown sandy clay | 1.0 | 14 | | | | | | |
| | | | Tan and gray clay w/tan and gray fine sand seams, some small calcareous nodules | 1.3 | 22 | | 51 | 21 | 30 | 16 | |
| | | | | | | 92% passing #200 sieve | | | | | |
| 5 | | | | 1.3 | 19 | | | | | | |
| | | | -w/black organic residue @ 7'+ | | 24 | | | | | | |
| 10 | | | -w/some red sandy clay @ 10'+ | 1.3 | 27 | | | | | | |
| | | | -w/iron stains and some limestone gravel @ 12'+ (Fill) | 2.4 | 29 | | 60 | 27 | 33 | 20 | |
| | | | | | | 67% passing #200 sieve | | | | | |
| 15 | | | | | | | | | | | |
| | | | *Pocket Penetrometer (tsf) | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | Vertical permeability @ 12' = $3.1 \times 10^{-8}$ cm/sec. | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |

Rone Engineers

Boring | B-2 | As directed by client

Project: Landf[illegible] Investigation, Denison, Tex

Completion Depth: 13.5' | Date: 8-3-82 | Water Observations: Dry @ completion

Surface El. | Type

| Depth, Ft. | Symbol | Samples | Stratum Description | * | Moisture Content % | Unit Dry Wgt. Lbs/Cu. Ft. | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very dark brown clay w/black residue | 1.0 | 17 | | | | | |
| | | | Brown to reddish brown and tan sandy clay w/ironstone nodules, and organic black residue | 2.4 | 15 | | | | | |
| 5 | | | | 2.75 | 16 | | 36 | 14 | 22 | 14 |
| | | | | | | 54% passing #200 se | | | | |
| | | | | 1.5 | 13 | | | | | |
| 10 | | | (Fill) | 1.75 | 15 | | | | | |
| | | | Tan and gray clayey sand | | 11 | | 34 | 17 | 17 | 13 |
| | | | | | | 44% passing #200 si | | | | |
| 15 | | | *Pocket Penetrometer (tsf) | | | | | | | |
| 20 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |
| 45 | | | | | | | | | | |
| 50 | | | | | | | | | | |

Ro

Log of Boring | B-3 | As directed by client

Project: Landfill ~vestigation, Denison, Texas

Completion Depth: 21.0' | Date: 8-4-82 | Water Observations: Seepage @ 8' during drilling

Surface El. | Type: Undisturbed Sample

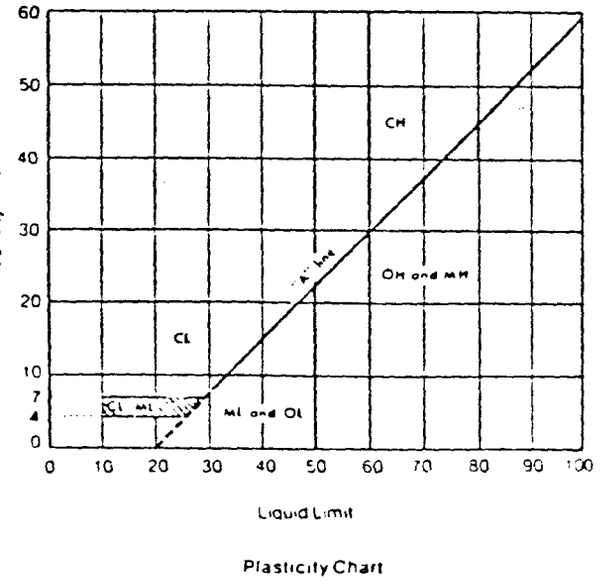
| Depth, Ft. | Symbol | Samples | Stratum Description | * | Moisture Content % | Unit Dry Wgt. Lbs/Cu. Ft. | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage % | Unconfined |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Black organic residue | 2.1 | 17 | | | | | | |
| | | | Tannish gray clay w/some sand and small calcareous nodules | 1.3 | 22 | | 46 | 22 | 24 | 13 | |
| 5 | | | -limestone cobble @ 5' | | | | | | | | |
| | | | -dark brown sand seam @ 6', w/black organic residue (Fill) | 1.6 | 20<br>25 | | | | | | |
| 10 | | | Reddish brown and tan sandy clay w/some black organic residue @ 10' | 1.75 | 24 | 64% passing #200 sieve | 45 | 21 | 24 | 17 | |
| 15 | | | | | | | | | | | |
| 20 | | | -w/thin seam of gray weathered shale @ 20' | 2.8 | 16 | | | | | | |
| 25 | | | *Pocket Penetrometer (tsf) | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | Horizontal permeability @ 10' = $2.1 \times 10^{-8}$ cm/sec. | | | | | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |

Rone En

| Major divisions | | | Grp. Sym. | Typical names | Laboratory classification criteria |
|---|---|---|---|---|---|
| Coarse-grained soils (More than half of material is larger than No. 200 sieve size) | Gravels (More than half of coarse fraction is larger than No. 4 sieve size) | Clean gravels (Little or no fines) | GW | Well-graded gravels, gravel-sand mixtures, little or no fines | $C_u = \frac{D_{60}}{D_{10}}$ greater than 4, $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 an |
| | | | GP | Poorly graded gravels, gravel-sand mixtures, little or no fines | Not meeting all gradation requirements for GW |
| | | Gravels with fines (Appreciable amount of fines) | GM | Silty gravels, gravel-sand-silt mixtures | Liquid and Plastic limits below "A" line or P.I. less than 4 — Liquid and Plastic lim plotting between 4 an are *borderline* cases quiring use of du symbols |
| | | | GC | Clayey gravels, gravel-sand-clay mixtures | Liquid and Plastic limits above "A" line with P.I. greater than 7 |
| | Sands (More than half of coarse fraction is smaller than No. 4 sieve size) | Clean sands (Little or no fines) | SW | Well-graded sands, gravelly sands, little or no fines | $C_u = \frac{D_{60}}{D_{10}}$ greater than 6, $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3 |
| | | | SP | Poorly graded sands, gravelly sands, little or no fines | Not meeting all gradation requirements for SW |
| | | Sands with fines (Appreciable amount of fines) | SM | Silty sands, sand-silt mixtures | Liquid and Plastic limits below "A" line or P.I. less than 4 — Liquid and Plastic limit plotting in hatched zon with P.I. between 4 and are *borderline* cases re quiring use of dua symbols |
| | | | SC | Clayey sands, sand-clay mixtures | Liquid and Plastic limits above "A" line with P.I. greater than 7 |
| Fine-grained soils (More than half of material is smaller than No. 200 sieve) | Silts and clays (Liquid limit less than 50) | | ML | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity | |
| | | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays | |
| | | | OL | Organic silts and organic silty clays of low plasticity | |
| | Silts and clays (Liquid limit greater than 50) | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts | |
| | | | CH | Inorganic clays of high plasticity, fat clays | |
| | | | OH | Organic clays of medium to high plasticity, organic silts | |
| | Highly organic soils | | Pt | Peat and other highly organic soils | |

GW, GP, SW, SP
GM, GC, SM, SC
*Borderline* cases requiring dual symbols

Determine percentages of sand and gravel from grain-size curve.
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 per cent
More than 12 per cent
5 to 12 per cent

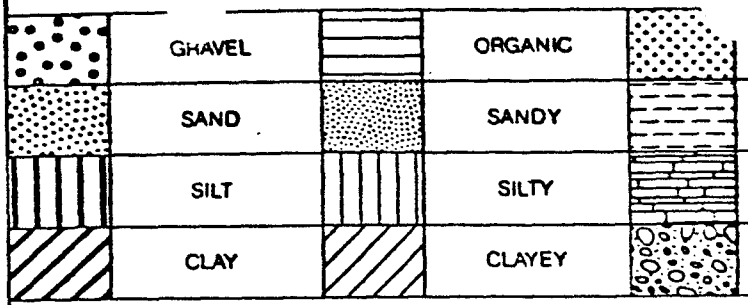



Plasticity Chart

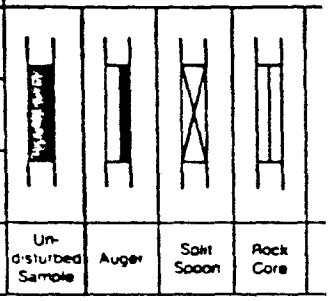
UNIFIED SOIL CLASSIFICATION SYST

Rose Eng

## SOIL OR ROCK TYPES




## SAMPLE TYPES




## TERMS DESCRIBING CONSISTENCY, CONDITION AND STRUCTURE OF SOIL

### Fine Grained Soils (More than 50% Passing No. 200 Sieve)

| DESCRIPTIVE TERM | COMPRESSIVE S tsf |
|---|---|
| Very Soft | Less than 0 |
| Soft | 0 25 to 0 5( |
| Firm | 0 50 to 1 0( |
| Stiff | 1 00 to 2 0( |
| Very Stiff | 2 00 to 4 0( |
| Hard | More than 4 |

*Note: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above because of planes of weakness cracks in the soil. The consistency ratings of such soils are based on penetrometer readings.

### Coarse Grained Soils (More than 50% Retained on No. 200 Sieve)

| PENETRATION RESISTANCE blows/foot | DESCRIPTIVE TERM | RELATIVE D |
|---|---|---|
| 0 to 4 | Very Loose | 0 to |
| 4 to 10 | Loose | 20 to |
| 10 to 30 | Medium Dense | 40 to |
| 30 to 50 | Dense | 70 to |
| OVER 50 | Very Dense | 90 to 1( |

Includes: (1) clean, fine gravels and sands, depending on distribution of grain sizes, and (2) silty or clayey fine gravels and sands. Condi according to relative density, as determined by laboratory tests or estimated from resistance to sampler penetration.

### Soil Structure

| | |
|---|---|
| CALCAREOUS | Contains appreciable deposits of calcium carbonate; generally nodular. |
| SLICKENSIDED | Having inclined planes of weakness that are slick and glossy in appearance. |
| LAMINATED | Composed of thin layers of varying color and texture. |
| FISSURED | Containing shrinkage cracks, frequently filled with fine sand or silt, usually more or |
| INTERBEDDED | Composed of alternate layers of different soil types, usually in approximately equal |

## TERMS DESCRIBING PHYSICAL PROPERTIES OF ROCK

### Hardness and Degree of Cementation

| | |
|---|---|
| VERY SOFT OR PLASTIC | Can be remolded in hand, corresponds in consistency up to very stiff in soils. |
| SOFT | Can be scratched with fingernail. |
| MODERATELY HARD | Can be scratched easily with knife; cannot be scratched with fingernail. |
| HARD | Difficult to scratch with knife. |
| VERY HARD | Cannot be scratched with knife. |
| POORLY CEMENTED OR FRIABLE | Easily crumbled. |
| CEMENTED | Bound together by chemically precipated material occurring in the interstices betwee particles of rock. Quartz, calcite, dolomite, siderite and iron oxide are common ce materials. |

### Degree of Weathering

| | |
|---|---|
| UNWEATHERED | Rock in its natural state before being exposed to atmospheric agents. |
| SLIGHTLY WEATHERED | Noted predominantly by color change with no disintegrated zones. |
| WEATHERED | Complete color change with zones of slightly decomposed rock. |
| EXTREMELY WEATHERED | Complete color change with consistency, texture, and general appearance approachi |

## KEY TO CLASSIFICATION AND SY

B. The Emulsion Solidification through Addition of Chemical and Mineral Agents.

Halff Associates successfully completed a similar waste solidification project in 1981. We solidified over five million gallons of oil sludge in an on-site landfill in Dallas, Texas. The solidification technique proved to be both an economical and environmentally sound disposal method. The results of this project were published in Waste Age, April, 1982.

The test objectives were to determine the type of material or materials and the corresponding ratios which would efficiently and economically solidify the waste creosote/water emulsion generated from W. J. Smith Wood Preserving Company. The resultant mixture of wastewater sludge and various solidification agents were evaluated under the following parameters; the mixture: (a) would not leach contaminants, (b) can be easily worked with heavy equipment; and, (c) is compatible along or with site material. The following procedure was established in testing each proposed solidifying material:

PROCEDURE:

- Weigh 20 - 30 grams of the creosote/water emulsion;
- Weigh corresponding amount of solidification material (native soil, kiln dust, crushed limetone screenings, volcanic ash) based on predetermined ratios;
- Ratios of 0.5:1, 1.0:1, 1.5:1, 2.0:1, 2.5:1, 3.0:1, and 4.0:1 grams of solidifying material to grams of creosote/water emulsion are to be tested;
- Gradually mix the material with the creosote/water emulsion until thoroughly mixed;
- Lightly compact to eliminate large voids;
- After one (1) hour, firmly compact the sample ten (10) times using the tip of the pocket penetromer;
- Using the soil test pocket penetromer, press firmly until red line on penetrating rod becomes even with top of soil. Read unconfirmed compressure strength on lower half of penetromer and record;
- Loosen sample completely;
- After twenty-four (24) hours, repeat compression test.

Note: Native soil and kiln dust were tested together in ratios: 1.0: 0.5: 1, 1.0: 1.0: 1, 1.5: 0.5: 1, 1.5: 1.0: 1, 2.0: 0.5: 1, 2.0: 1.0: 1 where the first number represents the soil, the second representing the kiln dust, and the third number in each set represents the creosote/water emulsion.

## TABLE VI - SOLIDIFICATION TEST

### ALBERT H. HALFF ASSOCI[illegible] INC.

| (1) Solidification Material | (2) Cost Per Ton ($) | (3) Ratio Material: Creosote | (4) Strength (Tons/ft$^3$) 1-Hour | (4) Strength (Tons/ft$^3$) 24-Hour | (5) Description |
|---|---|---|---|---|---|
| Native Soil | 0.00 | 1.0:1 | 0 | 0 | Very wet/never solidified/ disregarded |
| Native Soil | 0.00 | 2.5:1 | 0 | | Forms very thick paste/dif to work with/did not set-u |
| Native Soil | 0.00 | 3.0:1 | 0.5 | | Very black in color/moist ! liquid noticed/compacts sl |
| Native Soil | 0.00 | 4.0:1 | 1.4 | | Blackish-brown color/sligh moist/compacts well |
| Kiln Dust | 3.63 | 0.5:1 | 0 | 0 | Very moist/did not compact, present |
| Kiln Dust | 7.25 | 1.0:1 | 0 | 1.5 | Black in color/remains moi slightly compactable/diffi work with |
| Kiln Dust | 10.88 | 1.5:1 | 2.8 | 2.5 | Dark brown in color/not col easy to work with/compactat |
| Kiln Dust | 14.50 | 2.0:1 | 1.2 | 1.5 | Brown in color/fluffy powde not compact/very easy to wo |
| Soil/Kiln Dust | 3.63 | 1.0:0.5:1 | 0.75 | 1.8 | Black in color/thick paste/ to work with/will compact |
| Soil/Kiln Dust | 7.25 | 1.0:1.0:1 | 1.75 | 4.0 | Black in color/compacts ver paste very cohesive |
| Soil/Kiln Dust | 3.63 | 1.5:0.5:1 | 0 | 1.75 | Black in color/soft, very c difficult to work with |
| Soil/Kiln Dust | 7.25 | 1.5:1.0:1 | 3.5 | >4.5 | Dark brown in color/very co compacts very well |
| Soil/Kiln Dust | 3.63 | 2.0:0.5:1 | 0 | 1.25 | Black in color/very soft - hesive/difficult to work wi |
| Soil/Kiln Dust | 7.25 | 2.0:1.0:1 | 1.5 | 1.75 | Brown in color/slightly coh powdery/slightly compactabl |
| Crushed Limestone | 8.32 | 1.0:1 | 0 | 0 | Black - very moist/visible soft - not compactable |
| Crushed Limestone | 16.64 | 2.0:1 | 0 | 0.4 | Black - moist - no evidence liquid present/slightly coh |
| Crushed Limestone | 24.96 | 3.0:1 | 0.5 | 2.25 | Blackish-brown color/slightl moist - cohesive/slightly cc able |
| Soil/Crushed Lime-stone | 8.32 | 2.0:1.0:1.0 | 0 | 0.8 | Dark brown in color/slightly cohesive - easy to work with slightly compactable |
| Volcanic Ash | Unknown | 2.0:1 | 1.4 | 2.8 | Dark gray in color/slightly powdery/compacts very well |
| Volcanic Ash | Unknown | 3.0:1 | 1.6 | 3.6 | Gray in color/compacts very very easy to work with |

C. LEACHATE TEST ON SELECTED SOLIDIFIED SAMPLES CONTAINING WASTE CREOSOTE SLUDGE

The test objectives were to determine the component and corresponding concentrations leached from specific solidified creosote sludge samples following standard extraction procedures.

## ANALYSIS

On August 12, 1982, three (3) solidified sludge samples were submitted for analysis of organic leachable components. The results, previously reported by telephone, are shown below.

### RESULTS

Each of the three samples was leached using "EP Toxicity" methods as given in U.S. E.P.A. published materials. The leachate was then extracted using methylene chloride followed by concentration using standard Kuderna-Danish concentrators. The concentrate was then analyzed using GC/Mass Spectrometric Methods. The instrument of choice was a Hewlett-Packard 5995 GC/Mass Spectrometer System with dual Disc Drives. The spectra of eluting compounds were searched using in-house computer methods.

LEGEND:

Sample

(1) 10-K: a solidified mixture containing two (2) parts cement kiln dust, and one (1) part waste creosote sludge.

(2) X-M: a solidified mixture containing two (2) parts native soil, and one (1) part cement kiln dust, and one (1) part waste creosote sludge.

(3) 4-S: a solidified mixture containing four (4) parts native soil, and one (1) part waste creosote sludge.

ALLIED ANALYTICAL & RESEARCH LABORATORIES
3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224
Chemists
Consultants & Technologists

214/337-8

August 25, 1982

SAMPLE Sludges

DATE SUBMITTED 8/12/82

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 59803


SUBMITTED BY Albert Halff & Associates
Attn: Pat Jolly

ADDRESS 8616 North West Plaza
Dallas, Texas

## ANALYSIS

Sample: X-M

| COMPONENT | CONCENTRATION, ppm |
|---|---|
| Toluene | less than .1 |
| Aniline | less than .1 |
| Ethyl Benzene | less than .1 |
| Xylene | less than .5 |
| Dimethylpyridine | less than .5 |
| Benzonitrile | less than 1 |
| Phenol | 5 - 50 |
| Methylphenols | 5 - 50 |
| Napthalene | 10 - 100 |
| Xylenol | 1 - 10 |
| Benzazine | 50 - 500 |
| Propyl Phenol | 5 - 50 |
| Quinaldene | 10 - 100 |
| Lepidine | 10 - 100 |
| Dimethylquinoline | 1 - 10 |
| Acenapthene | 1 - 10 |
| Dibenzofuran | less than 1 |
| Tetrachlorophenol | less than 1 |
| Ethynyltoluene | 2 - 20 |

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY_____

ALLIED ANALYTICAL & RESEAR LABORATORIES
3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224
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Consultants & Technologists
214/337-891

August 25, 1982

SAMPLE Sludges

DATE SUBMITTED 8/12/82

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 59803


SUBMITTED BY
Albert Halff & Associates
Attn: Pat Jolly

ADDRESS 8616 North West Plaza
Dallas, Texas

## ANALYSIS

Sample ID: 4 - S

| COMPONENT | CONCENTRATION, ppm |
|---|---|
| Toluene | less than 1 |
| Napthalene | less than 1 |
| Terpene | less than 1 |
| Benzazine | less than 1 |
| Methyl Napthalenes | less than 1 |
| Butyl Phthalates | less than 1 |
| Ethylnyltoluene | less than 1 |

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY_____

LLIED ANALYTICAL & RESEAR. LABORATORIES
3031 Glenfield
P.O. Box 24330
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Chemists
Consultants & Technologists
214/337-895

August 25, 1982

SAMPLE Sludges

DATE SUBMITTED 8/12/82

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 59803
Page 4

SUBMITTED BY Albert Halff & Associates
Attn: Pat Jolly

ADDRESS 8616 North West Plaza
Dallas, Texas

## ANALYSIS

Sample ID: 10 -K

| COMPONENT | CONCENTRATION, ppm |
|---|---|
| MIBK | less than .1 |
| Toluene | less than .1 |
| Dimethylpyridine | less than 1 |
| Benzonitrile | less than 1 |
| Phenol | 2 - 20 |
| Ethylnyltoluene | 2 - 20 |
| Methyl Phenol | 10 - 100 |
| Napthalene | 50 - 500 |
| Xylenol | 10 - 100 |
| Benzazine | 5 - 50 |
| Propylphenol | 1 - 10 |
| Methyl Napthalene | 1 - 10 |
| Lepidine | 1 - 10 |
| Dimethylquinoline | 1 - 10 |
| Acenapthene | 1 - 10 |
| Diethylphthalate | less than 1 |

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY

D. Observations:

Volcanic ash was mixed with the creosote sludge at ratios of 2.0:1 and 3.0:1. The compressive strength for both mixtures was excellent (5,600 psf and 7,200 psf, respectively). The resultants mixtures were very easy to work with and consequently would provide excellent solidification characteristics as an encapsulation material for the creosote waste. However, due to the uncertainty of availability and unknown cost, further testing of the mixtures were discontinued.

Crushed limestone screenings were tested at various ratios (1.0:1, 2.0:1 and 3.0:1) and the results were poor compaction strengths after 24 hours at the lower loading rates. The 3.0:1 ratio yielded excellent compaction (4,500 psf) but due to large grain size of the material, effective solidification was suspect. The limestone was eliminated from future testing because of its ineffectiveness and prohibitive cost.

Cement kiln dust was tested and produced good results for workability and linear shrinkage, but yielded poor strength at lower loading rates. The kiln dust produced reasonable strengths quickly which also increased in strength as the material aired. It was anticipated that the resulting mixture of two parts kiln dust and one part creosote sludge would produce an excellent solidified material. The data from the leach tests were not favorable and, as a result, the kiln dust should not be used as the primary material for encapsulation.

Combination of native soil, kiln dust, and sludge produced a compactible and cohesive mixture. The 1.0:1.0:1 and 1.5:1.0:1 soil to kiln dust to sludge produced a high compressive strength (8,000 psf, and 9,000 psf, respectively) workable material. Data from the leachate test on the mixture showed definite improvement over the kiln dust, however, the results did not warrant considering mixture for solidification of the creosote.

When mixed with the creosote waste, the native soil produced a high compressive strength mixture at higher loading rates. Specifically, the compressive strength for the 3.0:1 and 4.0:1 mixture of soil to sludge was 3,000 psf to 5,200 psf, respectively. The results from the leachate tests conducted in the 4.0:1 ratio were excellent - no detectable components. It is therefore recommended that on-site solidification with native soil, or soil which possesses the following characteristics, be used to solidify the waste creosote sludge.

Soil Characteristics:

a) Moisture content . . . . . 16 - 24%

b) Liquid limit . . . . . 63 - 68%

c) Plastic limit. . . . . 26 - 31%

d) Linear shrinkage . . . . . 16 - 21%

## IV. RECOMMENDATIONS

Recommendations:

The following criteria used for selecting the solidification material and location/construction for the disposal land fill have incorporated the proposed parameters as suggested by the Texas Department of Water Resources Solid Waste Management Guidelines:

(1) Mixing, solidification and compaction characteristics;

(2) Availability of material, including quantity and delivery time;

(3) Cost of material based on tonnage;

(4) The fill material shall not leach free-flowing liquid;

(5) The fill should not leach into the surface or groundwater systems;

(6) The fill shall be placed in a thick, relatively impermeable formation (those earth materials classified under the unified soil classification as CL, CH, OH, and SC and/or exhibiting the following parameters:

| | | |
|---|---|---|
| a) | permeability . . . . . | $1 \times 10^{-7}$ cm/sec |
| b) | % passing No. 200 sieve. . . . | 30 |
| c) | Liquid limit . . . . . | 30 |
| d) | Plasticity index . . . . . | 15 |

(7) A minimum of 3 feet of compacted, relatively unpermeable cover shall be placed over the fill, and

(8) Surface should be stabilized with vegetative cover to minimize erosion.

Based on laboratory results, the availability of the material, and economics, it is recommended that the waste creosote be solidified with soil exhibiting similar characteristics to the soil used in the solidification tests as detailed in Section II. It is further recommended that solidification be performed with a ratio of four (4) parts soil to one (1) part sludge. Supported by the results obtained from the leachate tests (Section II, Part C), this procedure will inhibit infiltration of the creosote to the surrounding soil. A general description of the solidification operation is presented below.

An excavated fill will be constructed adjacent to the west end of the existing inactive sludge lagoons (refer to Plate X for appropriate location). The fill basin will be approximately five (5) feet below existing grade with an effective area of approximately 133,000 square feet. The soil removed during excavation will be mixed, compacted, formed into a berm, and keyed-in adjacent to the excavated fill. The approximate height of the berm will be 10 feet above existing grade, resulting in an effective disposal depth of 12 feet. Once complete, a 2-foot layer of soil will be spread over alternative sides of the disposal basin. A 6-inch layer of creosote sludge will be spread over the top of the soil and mixing of the two materials will be accomplished by a pulvi-mixer. After mixing, the resultant mixture will be compacted and tested by a geotechnical laboratory to insure that the fill meets percent moisture and compressive strength conditions. After solidification meets specifications, a 3-foot compacted layer will cap the fill, final grading will insure that standing water will not occur, and final cover will be planted (seeded grass). The location of the fill area and the location of the inactive storage lagoons will be defined in metes and bounds and filed in the Grayson County records.

Estimated time for completion of the disposal basin is approximately thirty (30) working days. An average of 66,000 gallons of sludge should be solidified per day, resulting in a projected time of forty-five (45) working days to complete encapsulation. Ten (10) working days to complete final site work is anticipated. Assuming a thirty percent contingency, a completion time of 110 working days is estimated.

In addition, it is recommended that the waste creosote from the gravity thickener located at the W. J. Smith Wood Preserving site be removed and disposed of off-site at an approved Class I land fill. The volume of the sludge is approximately 300 cubic yards, and the anticipated time for completion is six (6) working days.

Testing of the surrounding soil will be conducted to insure that all the waste creosote from the existing gravity thickener and inactive holding lagoons will be either removed or solidified during the closing operations. Three (3) feet of soil around the perimeter of the clay hole will also be removed during closing. Prior to closing, soil samples from the separator and inactive holding lagoon areas will be taken and background levels determined. This information and recommendations will be included within the final engineering plan for approval by the Texas Department of Water Resources. Testing of the soil during the closing operation will be conducted as follows:

- Once the waste creosote has been removed from the gravity separator and the inactive holding lagoons, soil samples will be taken from excavated areas.

- The test conducted on each soil sample will involve an analytical determination of the presence of creosote.

- Should the sample show levels of creosote higher than the background, additional soil in the areas of creosote contamination shall be removed and the material either solidified or removed to a

Class I landfill as previously recommended for the closing of the seven inactive holding lagoons and gravity separator respectfully.

- If creosote contamination is extensive then a french drain or similar installation could be installed and connected to a pumping pit. The creosote would then be removed over a long period of time until drainage ceases.

Gound water monitoring beneath the site and the surrounding area requires strategically located wells for an effective monitoring program. Ground water flow through any given profile may be complex, requiring several wells at different locations and depths for effective ground water monitoring. It is therefore recommended that four (4) monitoring wells be located around the perimeter of the existing gravity separator as shown in Figure VI. The exact location and depths of the monitoring wells will be detailed within the final engineering plan. Figure I identifies the location of an existing irrigation water well approximately 950 feet south southeast from the inactive holding lagoons. The depth of this water well is 65 feet and consequently, the depth of the proposed ground water monitoring wells will be approximately the same. The proposed monitoring wells will be sampled quarterly with the appropriate analyses run on each sample including determinations of Naphthalene and Acenaphthene.

It is also recommended that the irrigation existing water well be sampled concurrently with the proposed monitoring well and include identical analyses determinations. Adoption of this procedure will supplant additional monitor wells at the inactive holding lagoon site. The results of initial sample analyses will be submitted to the Texas Department of Water Resources Central Office. Subsequent sampling data will be kept on file and be available for inspection by TDWR personnel.

The monitoring wells will be cased and the annular space between the monitor zone and the surface will be completely backfilled with cement to effectively prevent percolation of surface water into the well bore. The well opening at the surface will have a removable cap to provide access and to prevent entrance of rainfall or stormwater runoff. The well casing is two (2) inches in diameter which will facilitate the use of a portable pump when obtaining samples. Figure VII gives a cross section view of the monitor wells recommended.

The proposed solidification process as outlined should be used as a guide. Upon receiving authorization from the state for closing the inactive holding lagoons and the existing gravity separator, a detail engineering plan and schedule addressing the background levels for soil sampling, and the exact location and depth of the ground water monitor wells will be formulated to maximize efficiency and minimize costs. W. J. Smith is prepared to act in accordance with the Compliance Schedule as presented to the Texas Department of Water Resources on November 21, 1983. (Refer to Attachment "A")

# W.J. SMITH WOOD PRESERVING COMPANY

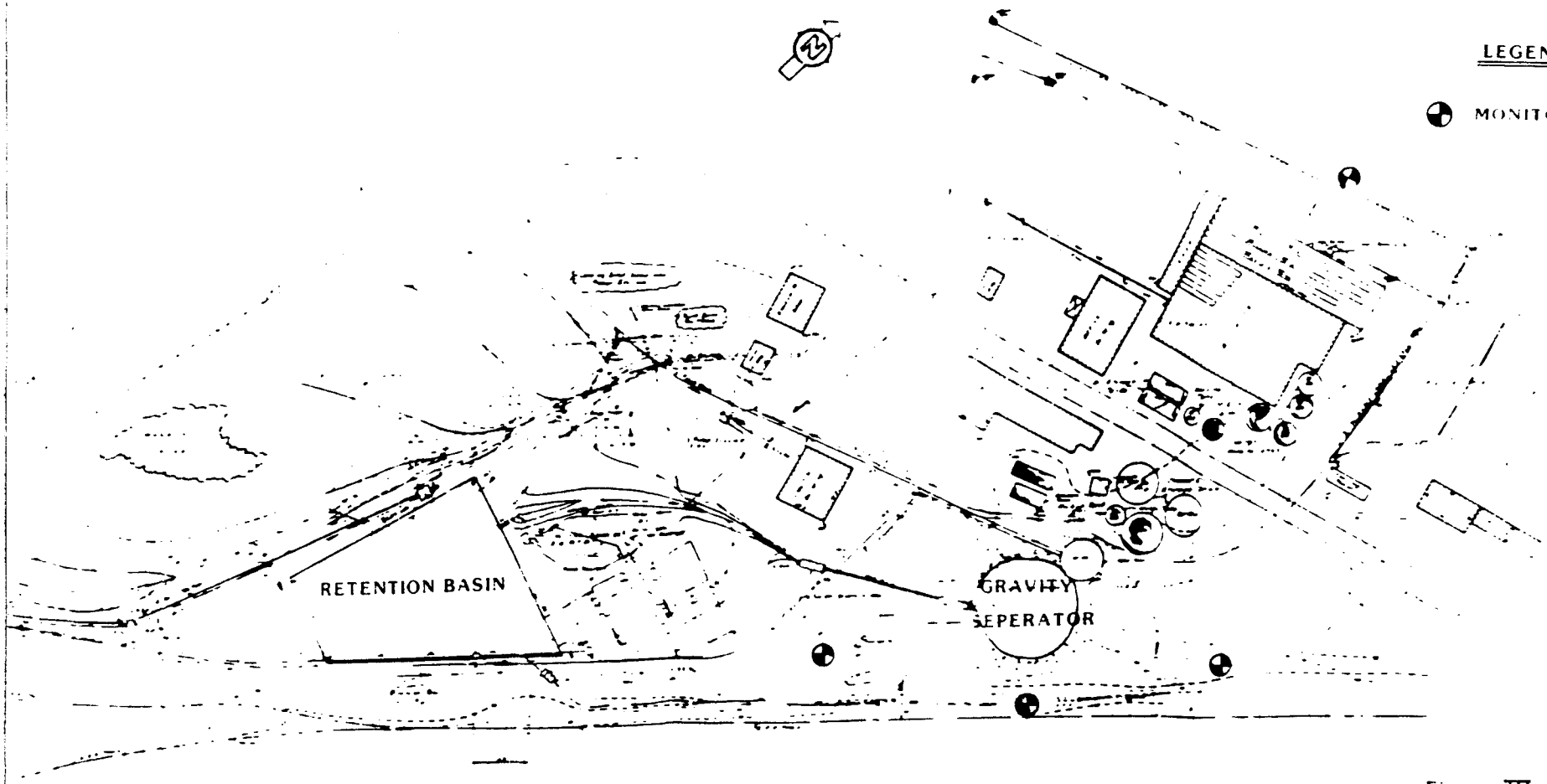
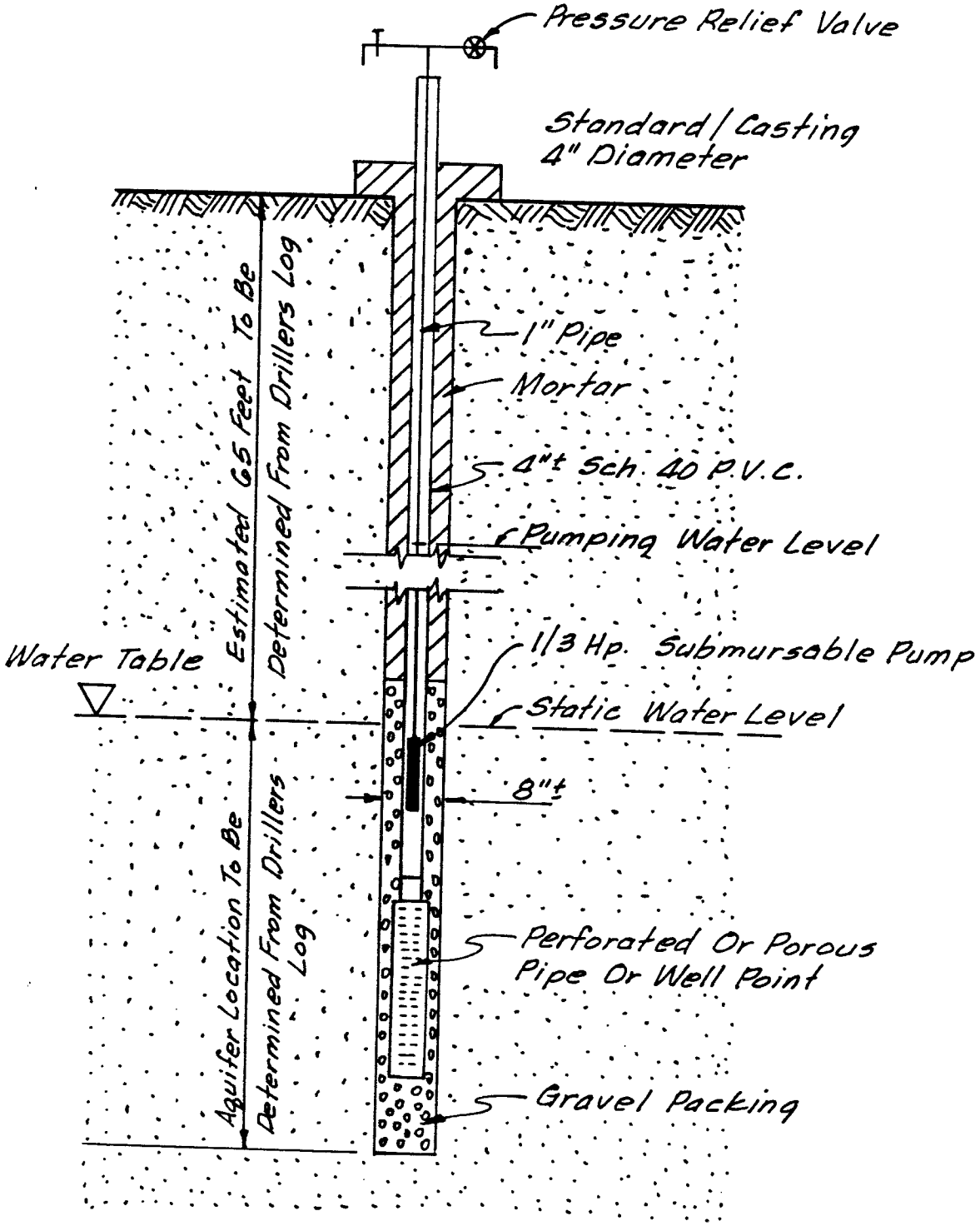



Figure VI

LOCATION OF

GROUND-MONITOR WELLS

## Preliminary
## Cross-Section Of Monitor Well



ATTACHMENT "A"

W. J. SMITH WOOD PRESERVING COMPANY
COMPLIANCE SCHEDULE

| ITEM | DESCRIPTION | DATE |
|---|---|---|
| 1 | Closure of Existing Creosote Holding Lagoons: | |
| | o Submittal of Closure Plan for Creosote Holding Lagoons and Gravity Separator | December 6, 1983 |
| | o Completion of Final Design and Specification for Closure of Holding Lagoons | 30 days after approval |
| | o Selection of Bids for Closure of Holding Lagoons | 60 days after approval |
| | o Begin Closure of Holding Lagoons | 74 days after approval |
| 2 | Closure of Existing Gravity Creosote Separator: | |
| | o Completion of Final Design and Specifications for Concrete Spillway from Existing Gravity Separator to the Existing Treatment Facility | March 1, 1984 |
| | o Approval on Final Design for Concrete Spillway | April 1, 1984 |
| | o Selection of Bids for Construction of Concrete Spillway | May 1, 1984 |
| | o Begin Construction of Concrete Spillway | May 14, 1984 |
| | o Selection of Bids for Closure of Existing Gravity Separator | May 14, 1984 or 30 days after approval |
| | o Begin Closure of Existing Separator | June 1, 1984 |
| 3 | Construction of New Concrete Separator: | |
| | o Completion of Final Design and Specifications for Concrete Creosote Separator to Replace Existing Gravity Separator | April 1, 1984 |
| | o Approval on Final Design for Concrete Separator | May 1, 1984 |
| | o Selection of Bids for Construction of Concrete Separator | June 1, 1984 |
| | o Begin Construction of Concrete Separator | June 14, 1984 |

"( Hole" Waste Separation Impour nt

| SURFACE IMPOUNDMENTS SITE INSPECTION REPORT *(Supplemental Report)* | INSTRUCTION Answer and Explain as Necessary. |
|---|---|

1. TYPE OF IMPOUNDMENT

Gravity separation basin (earthen) for creosolic waste stream.

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO No records available. Location verified visually.

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☒ NO

7b. FINDINGS

8. SOIL STRUCTURE AND SUBSTRUCTURE

Fine sandy loam to clay. See Attachment B, pages 2-8.

9. MONITORING WELLS

☐ YES ☒ NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH X WIDTH X DEPTH Diam. - approximately 35-40 feet
Depth - approximately 6 feet

11. CALCULATED VOLUMETRIC CAPACITY

300 yards

12. PERCENT OF CAPACITY REMAINING

25%

13. ESTIMATE FREEBOARD

1.5

14. SOLIDS DEPOSITION

☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD

Bottom creosote is pumped to holding pond and re-used in the process.

16. OTHER EQUIPMENT

| SURFACE IMPOUNDMENTS SITE INSPECTION REPORT *(Supplemental Report)* | INSTRUCTION Answer and Explain as Necessary. |
|---|---|

1. TYPE OF IMPOUNDMENT

Earthen disposal pits used from 1909 to 1971 for creosotic wastes.

2. STABILITY/CONDITION OF EMBANKMENTS

Appeared good.

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO Location verified visually.

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☒ NO

7b. FINDINGS

8. SOIL STRUCTURE AND SUBSTRUCTURE

Closure plan reported clay fill underlies waste pits.

9. MONITORING WELLS

☐ YES ☒ NO One irrigation well is loated 900' to SE.

10. LENGTH, WIDTH, AND DEPTH

LENGTH 650' WIDTH 200' DEPTH 6-10' (total area given)

11. CALCULATED VOLUMETRIC CAPACITY

30,000 cubic yds.

12. PERCENT OF CAPACITY REMAINING

50%

13. ESTIMATE FREEBOARD

1-3 feet

14. SOLIDS DEPOSITION

☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD

Not yet done.

16. OTHER EQUIPMENT

Access not controlled.

ENGINEERING-SCIENCE, INC.
SITE INSPECTION TEAM
SITE SAFETY AND WORK PLAN

## A. GENERAL INFORMATION

Site: W. J. Smith Wood Preserving Hazsit No.: TX 06785

Location: Denison, Texas 1700 W. Morton St.

Plan Prepared by: Barry E. North Date: 4/18/84

Approved by: _____ Date: _____

Objective(s): Review records to establish history of on-site waste management. Ascertain current status of site. Evaluate potential for surface and groundwater contamination. Obtain samples of soil, ground water (if possible), spills. Analyze for phenols, cresols, polycyclic aromatic compounds.

Proposed Date of Investigation: Week of May 28

Preliminary Assessment Hazard: High _____ Medium _____ Low X (unknown)
None _____ Unknown _____

## B. SITE/WASTE CHARACTERISTICS

Waste Type(s): Liquid X Solid _____ Sludge X Gas _____

Characteristic(s): Corrosive _____ Ignitable _____ Radioactive _____
Volatile _____ Toxic X Reactive _____
Unknown _____ Other _____ (Name) _____

Facility Description: A series of seven pits covering approx. 3.5 acres. Wood preserving facility. Surface storage tanks, retension basin, trickling filters. Seven holding basins were used for disposal of sludge produced from manufacturing facility (1907 to 1971)

Principal Disposal Method (type and location): Treated wastewater (after trickling filter disposed to sanitary sewer.

Unusual Features (dike integrity, power lines, terrain, etc.) None

Status: (active, inactive, unknown): Unknown - Plans for closure of basins and inactive areas of site submitted to TDWR

History: (worker or nonworker injury, complaints from public, previous remedial or enforcement action): Enforcement actions related to RCRA compliance

## C. HAZARD EVALUATION

The current status of the site is unknown. The creosote sludge holding basins may contain creosote residues containing toxic and carcinogenic substances (phenols, cresols, creosole, polynuclear aromatics). Precautions should be taken to prevent skin and eye contact and clothing contamination with sludges and other wastes, especially during sampling.

## D. SITE SAFETY WORK PLAN

PERSONAL PROTECTION

LEVEL OF PROTECTION: A____ B____ C____ D X

MODIFICATIONS: rubber gloves for sampling, rubber boots

SURVEILLANCE EQUIPMENT AND MATERIALS:

SITE ENTRY PROCEDURES: Contact site owners to arrange access for inspection

DECONTAMINATION PROCEDURES: Dispose gloves used for sampling

Special Equipment, Facilities, or Procedures:

| Team Member | Responsibility |
|---|---|
| | |
| | |
| | |
| | |
| | |

## E. EMERGENCY INFORMATION

### LOCAL RESOURCES

Ambulance:

Hospital:

Poison Control Center:

Police:

Fire Department:

EPA Contact:

TDWR Contact: Daniel L. Scheppers (512) 475-1344

Emergency Contacts:

Project Safety Manager: Dr. Barry North (303) 455-4427

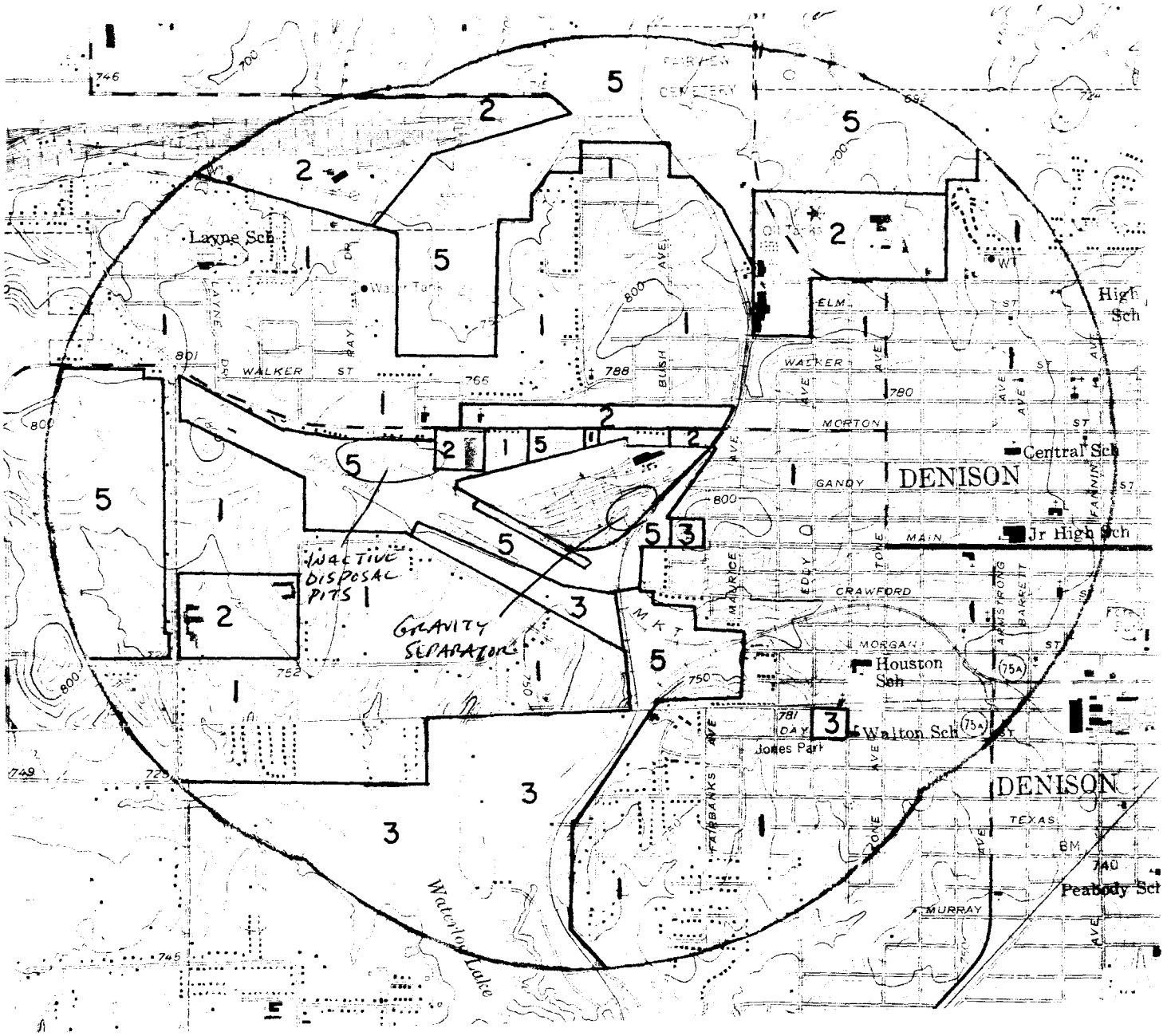
Project Manager: David G. Johnson (512) 477-9901 892-3755

## F. EMERGENCY ROUTES

HOSPITAL: _____

OTHER: _____

Land Use Pattern Within One Mile of W. J. Smith Wood Preserving Company




Scale 1" = 2,000'

Legend

| | |
|---|---|
| Residential | - 1 |
| Commerical | - 2 |
| Recreational | - 3 |
| Agricultural | - 4 |
| Undeveloped | - 5 |

Source:

Maps are U.S.G.C. 7.5 Minute Quad.
Denison Dam, Texas - Oklahoma
(Photorevised 1973)
Sherman, Texas (photorevised 1974)

C.N - 10786

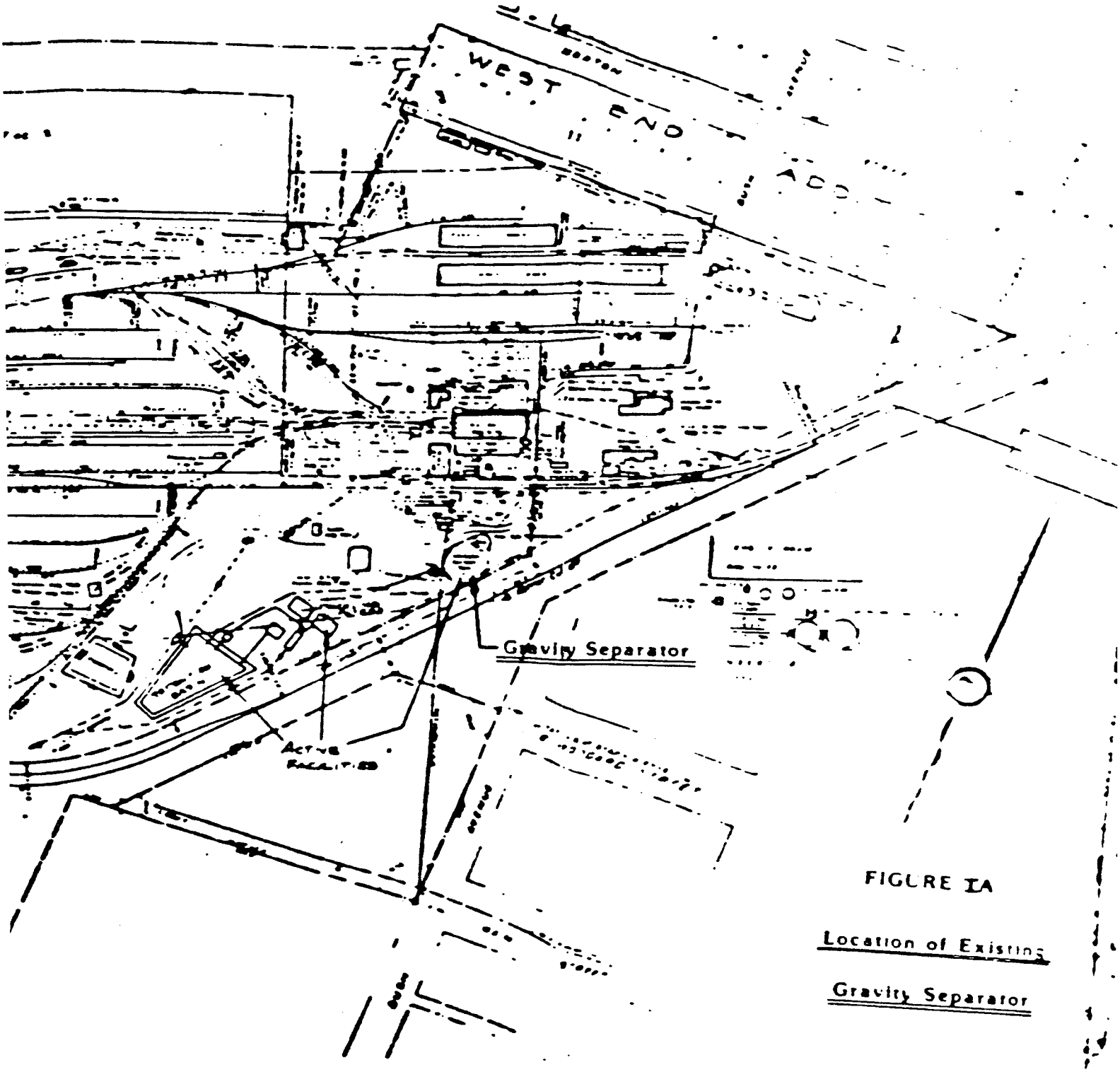


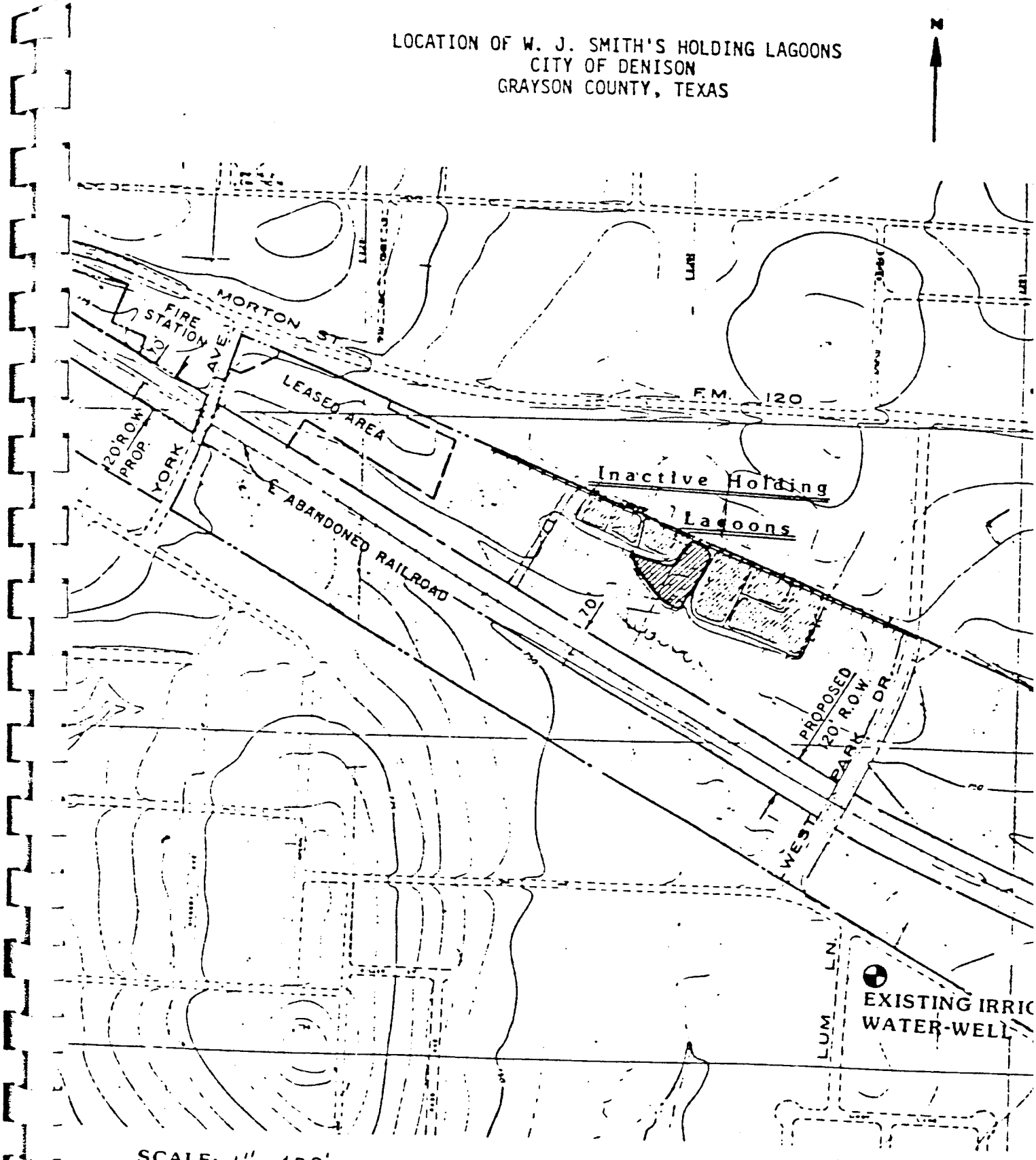

FIGURE IA

Location of Existing

Gravity Separator

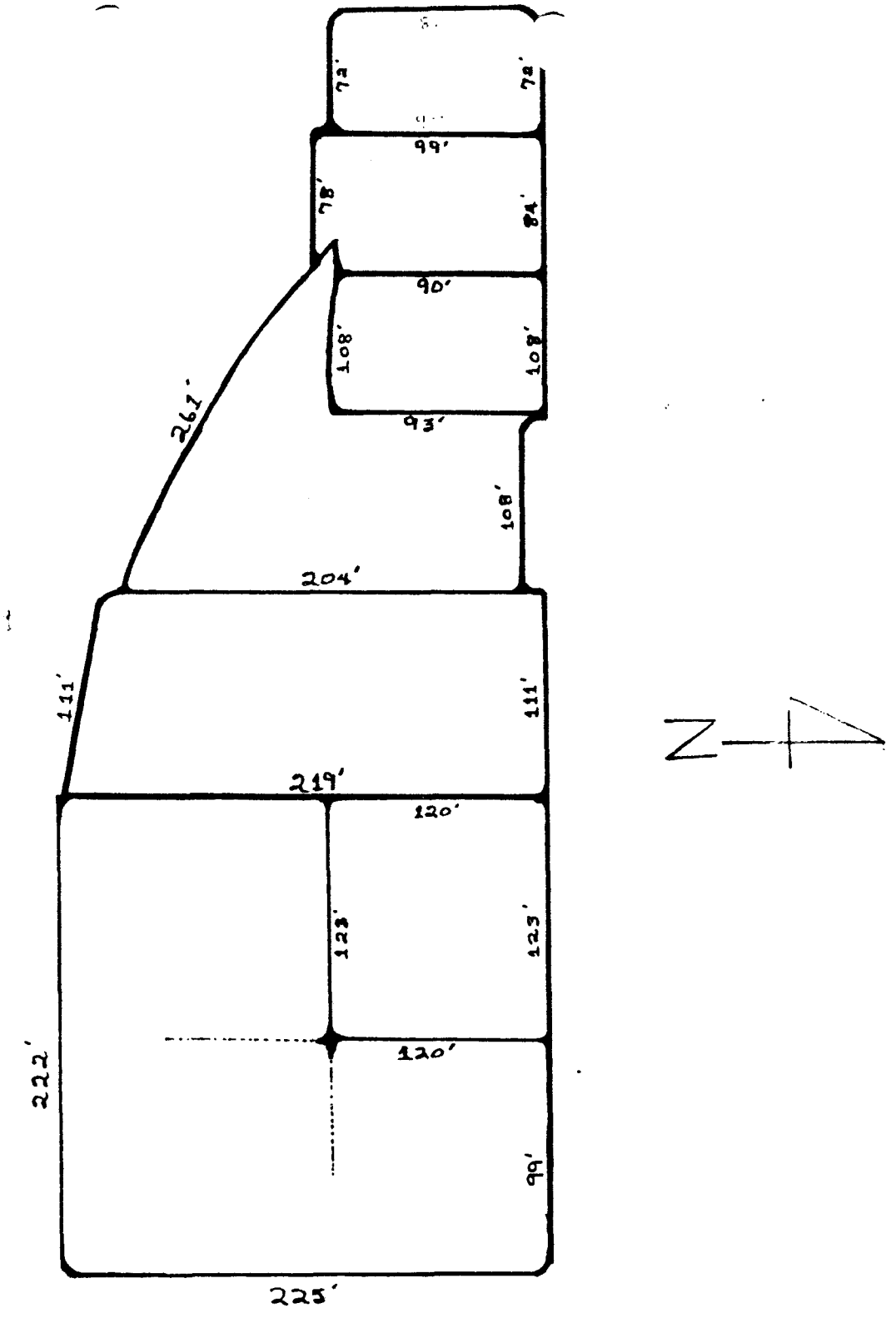
Figure

LOCATION OF W. J. SMITH'S HOLDING LAGOONS
CITY OF DENISON
GRAYSON COUNTY, TEXAS

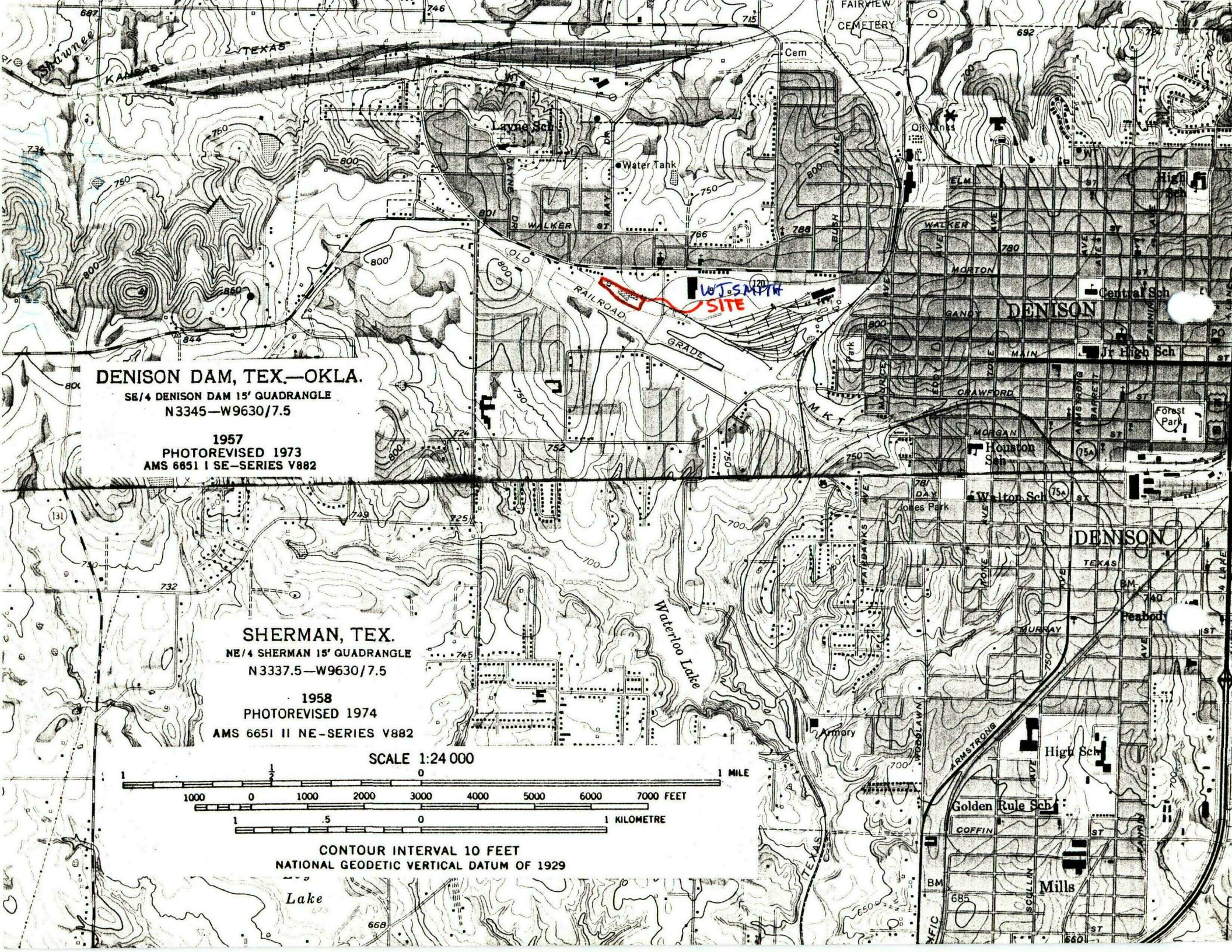


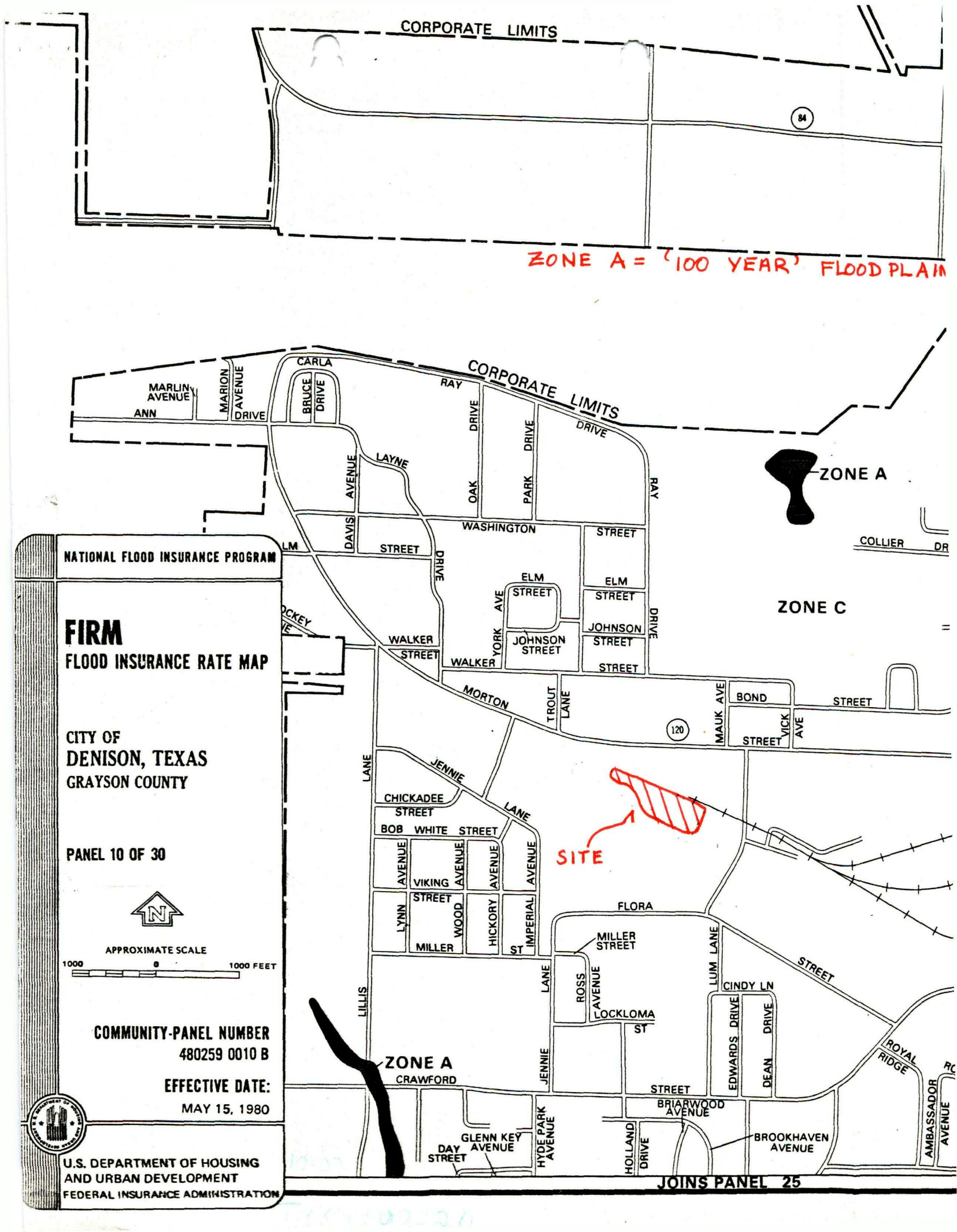

SCALE: 1" = 400'

11/28/83




| Texas Department of Water Resources — District 4 |
|---|
| W. J. SMITH Wood Preserving Co.<br>DENISON, TEXAS |
| D. C. Eubank 12-8-80 |


DENISON DAM, TEX.—OKLA.
SE/4 DENISON DAM 15' QUADRANGLE
N3345—W9630/7.5
1957
PHOTOREVISED 1973
AMS 6651 I SE—SERIES V882
SHERMAN, TEX.
NE/4 SHERMAN 15' QUADRANGLE
N3337.5—W9630/7.5
1958
PHOTOREVISED 1974
AMS 6651 II NE-SERIES V882
SCALE 1:24 000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
W.J. SMITH
SITE
DENISON
Waterloo Lake
Layne Sch
Water Tank
Central Sch
Jr High Sch
Houston Sch
Walton Sch
Forest Park
Peabody
Armory
High Sch
Golden Rule Sch
Mills
FAIRVIEW CEMETERY
RAILROAD GRADE
M.K.T.
Lake


CORPORATE LIMITS
84
ZONE A = '100 YEAR' FLOOD PLAIN
CORPORATE LIMITS
CARLA
MARLIN AVENUE
ANN
MARION AVENUE
DRIVE
BRUCE DRIVE
RAY DRIVE
LAYNE AVENUE
OAK DRIVE
PARK DRIVE
RAY DRIVE
ZONE A
COLLIER DR
WASHINGTON STREET
DAVIS STREET
DRIVE
ELM STREET
ELM STREET
YORK AVE
JOHNSON STREET
JOHNSON STREET
WALKER STREET
WALKER STREET
ZONE C
MORTON
TROUT LANE
MAUK AVE
BOND STREET
VICK AVE
STREET
120
JENNIE LANE
CHICKADEE STREET
BOB WHITE STREET
SITE
VIKING AVENUE
LYNN AVENUE
WOOD STREET
HICKORY AVENUE
IMPERIAL AVENUE
FLORA
MILLER STREET
MILLER ST
LILLIS LANE
ROSS AVENUE
LUM LANE
CINDY LN
STREET
LOCKLOMA ST
EDWARDS DRIVE
DEAN DRIVE
ROYAL RIDGE
ZONE A
CRAWFORD
JENNIE LANE
STREET
BRIARWOOD AVENUE
GLENN KEY AVENUE
DAY STREET
HYDE PARK AVENUE
HOLLAND DRIVE
BROOKHAVEN AVENUE
AMBASSADOR AVENUE
JOINS PANEL 25
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CITY OF
DENISON, TEXAS
GRAYSON COUNTY
PANEL 10 OF 30
N
APPROXIMATE SCALE
1000 0 1000 FEET
COMMUNITY-PANEL NUMBER
480259 0010 B
EFFECTIVE DATE:
MAY 15, 1980
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Photographer / Witness

GH Fowler / BK, PJ

Date / Time / Direction

5-22-84 / 1000 pm

Comments: Surface impoundment (earthen - called "clay hole") used for gravity separation of creosote wastewater

Photographer / Witness

GH Fowler / BK, PJ

Date / Time / Direction

5-22-84 / 1030 pm

Comments: Foreground is concrete impoundment ("rock hole"), Bkgrd is earthen impoundment ("clay hole") for waste separation.

Photographer / Witness

Date / Time / Direction

Comments:

Photographer / Witness

Glynis H Fowler / BR, PJ

Date / Time / Direction

5-22-84 / 10⁰⁰ pm / North

Comments: Easternmost inactive disposal pond for creosote wastes from 1904 - 1969

Photographer / Witness

GH Fowler / BR, PJ

Date / Time / Direction

5-22-84 / 10⁰⁰ pm

Comments: One of 7 inactive disposal ponds used for creosote wastes from 1909 - 1969

Photographer / Witness

GH Fowler / BR, PJ

Date / Time / Direction

5-22-84 / 10⁰⁰ pm

Comments: Same as above